The Builder.

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Pugin Studentship Drawings, R.I.B.A.: A Corner of the Doges' Palace, Venice; and Doorhead, Caudebec-en-Caux ..... By Mr. C. Wontner Smith.
Grissell Medal Drawings, R.I.B.A., 1902: Design for Roof of a Picture Gallery ..... By Mr. Lionel U. Grace.

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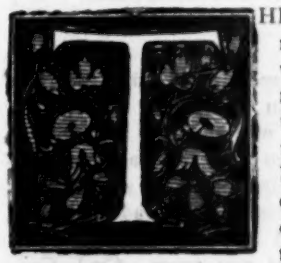
Furness Abbey, Lancashire.



THE planning of the remains of the various monasteries that lie scattered throughout the length and breadth of the country, and the careful excavation of buildings and foundations hitherto hidden, forms, perhaps, the most fascinating branch of purely architectural archæology. Of late years a good deal has been done in preserving ruins that had fallen into decay, or were threatened with early destruction if not carefully examined and preserved. The great growth of ivy, often a very picturesque feature in itself, has been in many cases removed, and its removal has no doubt preserved for many generations to come what in all probability would not have lasted much beyond the present one. The name of Mr. W. H. St. John Hope has been closely identified with the revival of this work, with the careful planning and excavating of these interesting buildings, and the work on Furness recently published is a further addition to the already valuable work that has been done by him.*

The carefully-written papers or monographs lately contributed by him on Castle Acre and Fountains have been in the first instance published in the proceedings of the Archæological Societies in whose counties the remains stand, and the present work originally in like manner appeared in the proceedings of the Cumberland and Westmoreland Archæological Society, and is now published in book form, with several additional illustrations.

The author contributed an interesting account of the ruins to the *Builder*, January 6, 1895, when Furness was illustrated in the series of "Abbeys of England and Wales." Before that date a certain amount of work had been done in clearing the site of the church—indeed, as far back as sixty years ago something had been done, although it was only in 1881-2 that the cloister and the interesting buildings that surround it were dealt with. By far the most important work of arriving at the meaning of the complex series of buildings dates from September, 1896, and it was continued in the corresponding months of the two following years under the auspices of the county Archæological Society, and under the personal direction of the author.

The chief feature of Mr. Hope's book, and its most valuable one, is undoubtedly the large ground plan, in which no less than ten colours have been used to denote the various dates of the buildings—a great assistance to the reader in properly understanding, so far as it is possible to say with certainty at the present time, the numerous alterations and additions that took place between the foundation in the early years of the twelfth century and the suppression in the sixteenth. In many ways the plan followed the general lines so characteristic of the great Cistercian houses, and the simple form of the church, with its transept chapels, the position of the choir, pulpitum, and nave altar, the great buildings on the east and west respectively that formed the dormitories and their substructures of the monks and *conversi*, and the frater placed at right angles with the church on the further side of the cloister, will recall in general arrangement the abbeys of Kirkstall, Rievaulx, Byland, and Buildwas, and many others. Three or four points, however, are of considerable interest. Quite recently (in 1900) the foundation of part of the original church has been unearthed, showing that before the church assumed its Cistercian form an older building, with apsidal chapels to the transepts, stood on the site; and although, perhaps, the early work was never carried very far, this interesting discovery has added much value to the plan. On account of the existing buildings, the sacristy, so generally found at the end of the transept, here forms an aisle to the presbytery, and the book cupboard, which often was in line with the sacristy but divided from it and approached from the cloister only, here occupied two large recesses flanking the entrance to the great thirteenth-century chapter-house.

The alteration on the south side of the cloister wall entailed the demolition of the original frater, which, apparently, had been placed parallel with the church on the Benedictine plan; the cloister was enlarged by the breadth of this frater, and its south wall was retained, and formed the outer wall of the new cloister. This was pierced and the new frater was built north and south in the usual Cistercian manner. The description and plan of this part of the buildings is one of the most interesting in the book, and shows with what care an attempt has been made to solve the difficult problem of the amount of rebuilding that evidently took place here at two or three subsequent dates.

Forming roughly a semicircle round the buildings that immediately surrounded the cloister was a group of hardly less important buildings, one at least of which—the Great Infirmary or "Farmery" Hall of the monks—was of great size. Much has here been levelled even to the foundations, but enough remains to have enabled Mr. Hope to restore its general dimensions and arrangement on the ground plan. Other buildings were the abbot's house, itself formerly to all appearances an infirmary; a third infirmary for the *conversi* near the south-west angle of the buildings on the west side of the cloister; while north of the church was a porch and enclosing wall to the cemetery, and at a distance of about 400 ft. the Great Gatehouse, an outer precinct gate with a chapel adjoining, and a third gatehouse on the western side.

Besides the valuable ground-plan are several collotype illustrations from photographs by Mr. H. Brakspear and some sections and details of the early presbytery floor and the infirmary hall. A large number of steel engravings are added, originally prepared for Beck's "Annales Furnesienses," giving views of the various parts of the ruins as they then were, the monumental effigies and slabs, and one or two sections through the chapter-house. These, in many cases, good examples of engraving add to the artistic excellence of the work; but from a strictly architectural point of view, and with the elaborate ground-plan already described, the value of the volume would have been still greater if more measured sections and elevations could have been given. The reader of Mr. Hope's elaborate architectural notes on the buildings would also find it more convenient if the plan had been mounted and inserted in a pocket, so that it could be spread out before him to refer to;

* The Abbey of St. Mary in Furness, Lancashire. By W. H. St. John Hope, M.A. Kendal: Printed and published by T. Wilson. 1902.

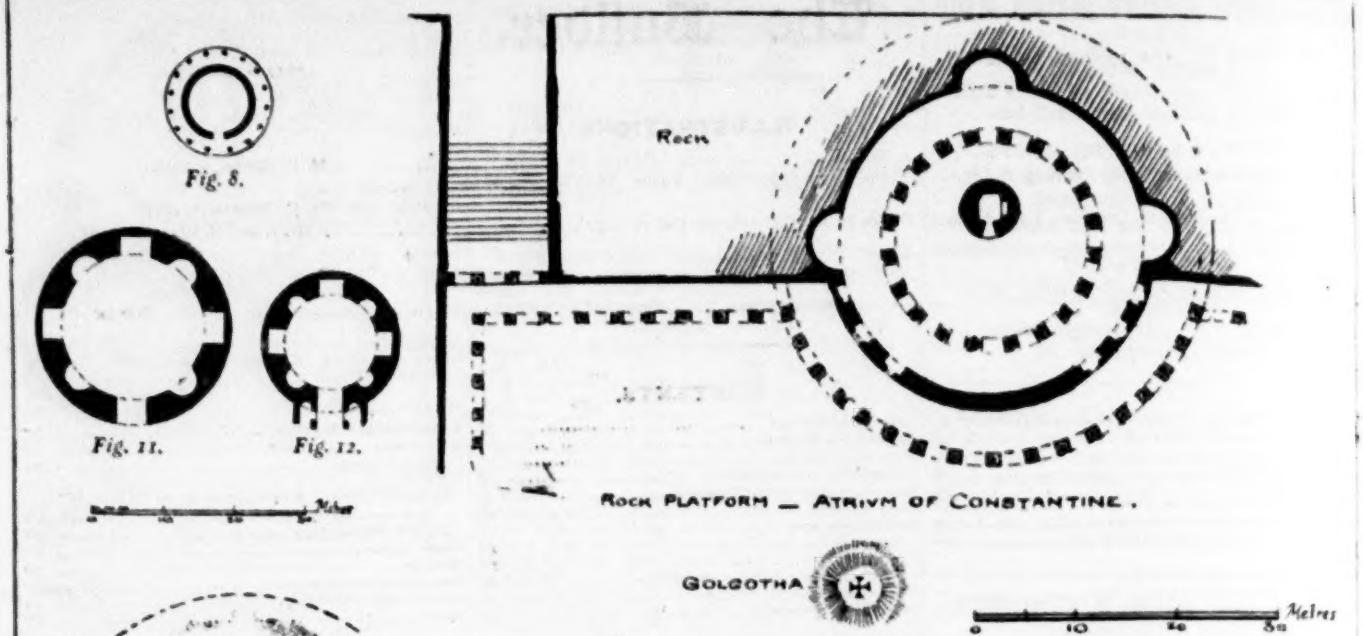


Fig. 8.

Fig. 11. Fig. 12.

Fig. 10.

Fig. 9.

8. Mausoleum of St. Luke, Ephesus (from Wood's "Ephesus").
9. The Anastasis, Jerusalem.
10. S. Stefano Rotondo.
11. Mausoleum of Helena.
12. Torre dei Schiavi, Rome.

to follow the intricate arrangement of the buildings is scarcely possible without constant reference to the plan. Apart from these points the work is excellent, both in matter and illustration, and it will be a valuable addition to the accounts of the abbey that already exist, bringing the description of the monastery more up to date than has been previously possible.

ANCIENT CIRCULAR CHURCHES.—II.

TURNING our attention towards the East, it would probably not be difficult to find numerous examples of circular Christian churches built in the early centuries, and, perhaps, before the time of Constantine. The late Mr. Wood, in his discoveries at Ephesus (1865), came upon a large circular building within the city walls, which he identified as Christian. His restoration on paper of this edifice would lead one to suppose it to have been designed in days when the classic style of art was at its zenith. It was a circular chamber 30 ft. in diameter, covered by a dome and with an encircling peristyle of the usual "Ionic order." Within the stylobate supporting this building was (apparently) a sepulchral crypt. Mr. Wood supposed this to have been the Mausoleum of St. Luke, which is said to have existed at Ephesus (fig. 8).

The regions of Asia Minor, where Christianity flourished particularly during the earlier centuries, are still very little explored. Amongst the innumerable deserted sites of once flourishing Roman cities many evidences of primitive Christian churches remain to be discovered, and we should expect to find the circular plan frequently adopted. The few remains of primitive times which have been identified seem to have attracted but little attention as yet. Syria possesses abundant examples of churches of the period subsequent to the publication of the Edict of Constantine, and many of them are remarkably well preserved. But of the earlier centuries very little has been discovered up to the present. The northern regions of Antioch and Edessa, where Christianity occupied so important a position from the very first, remain almost a *terra incognita*, and the same may be said for those districts still further to the north and east, which, according to Gibbon, were Christianised in primitive times. In the southern part of the country an absence of good building materials perhaps accounts for the disappearance of ancient monuments. This region has also been hitherto studied from a somewhat exclusively Biblical point of view by the Protestant archæologists, whilst the work of the "Société Latine" is almost confined to Mediæval history.

The greatest politico-religious change the world has ever seen was certainly when the Imperial Government of the fourth century decided upon the recognition of Christianity as one of the religions of the State. From this period onwards the monuments which mark the gradual development of religion, and, perhaps, the decay of taste, at least in a classic sense, are merely historical. As to circular churches, it is interesting to observe a new element which accounts for the survival of such a plan during and after the fourth century. Traditions of the early circular church may survive in this later development, although an "oblong" form seems to have been imposed upon church builders by such early documents as the "Apostolic Constitutions." The new development here referred to arose from a sentiment for reproducing the circular form of the church of the Holy Sepulchre in Jerusalem (fig. 9).

The circular construction enclosing the rock-cut shrine of the Holy Sepulchre or Resurrection (Anastasis) in Jerusalem is, of course, the most famous and remarkable of all Christian (and at the same time circular) churches in existence. It is in a sense the centre of the whole system, and seems to symbolise after the manner of the more ancient Temple of Vesta, a concentric idea of the universe. (Vesta eadem est que terra subest vigil ignis utrique significant sedem terra focus que suam. Cic.) Certainly, it has been the focus of all Christendom—Roman, Greek, Armenian, or African—throughout all ages, and even in these latter days it has attracted a certain amount of Protestant controversy. As a matter of fact, we know the actual history of this monument as far back as the time of Constantine, before which date nothing of an important character would appear to have existed on the site. This site in a most remarkable degree retains the original planning and disposition of the famous monument of the fourth century (fig. 9). The plan which we here present agrees in the main with received theories, and, what is of still greater importance, with the actual measurements of existing vestiges and remains, and with the contemporary evidence of Eusebius, Cyril, and other undoubted authorities. The only portion of the combination of Basilica, Anastasis, Exedræ, &c., constituting the magnificent monument erected by the Emperor Constantine which concerns the present subject is the circular church or enclosure of the tomb. It must be remembered that in its origin this circular enclosure did not constitute a covered-in "church" in the usual meaning of that term, but it seems to have resembled the colonnaded *impluvium* of a Roman house of a circular form. This peculiarity in the structure of the building by which the sacred relic of the tomb was left exposed to the open sky was religiously preserved throughout the ages, and not until the Russians in 1870 constructed the modern iron-girder dome was the church completely roofed over with a glass skylight. The water gargoyles on the roof of the tomb of the beginning of the nineteenth century still remain in position, although no longer of any use.

Jerusalem has a particular local character

attaching to its religious monuments, perhaps more reminiscent of ancient Egypt than any other country. The enclosure and decoration of the holy sites ordered by the Emperor would be confided to the workers in the local style of which we see so many examples in the Valley of Jehosophat and at Petra. The so-called "Tomb of Absolom" or "Pharaoh's Cap" tomb under the eastern wall of the city is probably very much like the original design of the Holy Sepulchre, but without the colonnaded porticos. In a precisely similar manner the rock-cut chamber was treated as the interior of a block of stone, carved out and freed from the cliff or mountain side by a space of considerable width. In this way the cube of rock assumed the appearance of a one-roomed hut or shrine. Many other examples of such a treatment might be instanced in addition to the "Pharaoh's Cap." In the case of a similar tomb in the village of Siloam the rock-cut interior has been occupied as a house for untold generations, and the surrounding space detaching it from the hillside has been filled with additional chambers. At Petra there are countless examples of this treatment, but nothing carried out with the magnificence of the Holy Sepulchre. By studying such examples we may, perhaps, form some idea of Constantine's work in Jerusalem, of which not a fragment of carving or decoration remains in the Anastasis, although the lower part of the Basilica is to a great extent preserved. They seem all to belong to the period of the Roman Empire, when the decaying taste in purely architectural form combined with inappropriate ornamentation, and a desire for mere display produced the strangest creations, many of which remind one of the extravagant piling up of meaningless details in shell grottoes or Dresden china architecture. Broken pediments, imitation arches, clumsily-imitated columns, and misunderstood details of actual construction hewn out of the solid rock give an impression of depraved taste which it would be difficult to parallel, even with the "ignoble grotesque" of the seventeenth century. Such work exhibits the inherent inability of the Arab and Levantine races, which occupied the district at that period much as they do at the present day, to do more than clumsily copy from Western civilisation whenever they wished to produce anything of a monumental or decorative character.

The style of art and decoration employed by Constantine, although of this deplorable local character, would in the case of the Holy Sepulchre be redeemed to some extent by the scale of the monument. To judge by the fragments remaining of the east front of the Basilica, the general scale of the buildings was imposing—the colonnades surrounding the tomb would probably be about 40 ft. in height. The western half of the inner colonnade served to screen the rock face where it had been excavated to the semicircular form with three small apses as shown on the plan, leaving the Sepulchre as a detached block on the chord of the semicircle. Towards the east the completion of the circular boundary was formed by a wall with doorways therein, as the careful description of the monument by the pilgrim Sylvia of Aquitaine (fourth century) contains references to the sound of voices heard *within* the Anastasis from outside. It is a little difficult to understand how the enclosing wall lines were carried entirely round the tomb in spite of the difference of level between the rock platforms on the east and west sides. This difference was perhaps surmounted by making the eastern wall of a sufficient height for the cornice or coping to range all round*. In the ancient representations of the buildings during the fourth century only the tomb itself is ever shown, being the object which would naturally attract the attention of the artist under the circumstances.

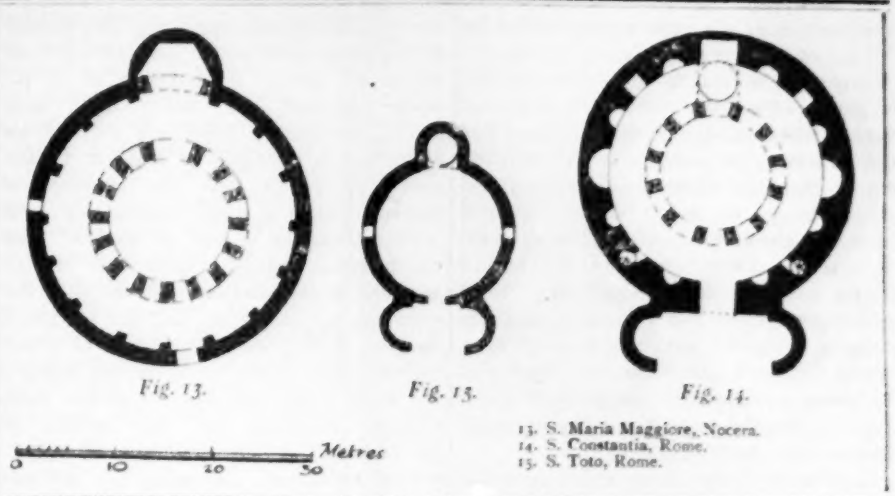


Fig. 13. *Fig. 13.* *Fig. 14.*

13. S. Maria Maggiore, Nocera.
14. S. Constantia, Rome.
15. S. Toto, Rome.

For the present purpose we are hardly concerned with the Church of the Holy Sepulchre in its primitive state, and its connexion with the interesting early examples of round churches in Rome, and elsewhere, above referred to would be hard to define. At first the circular colonnade was intended merely to form a glorified enclosure of the precious shrine in the same way as a similar circular roofless church was built around the traditional site of the Ascension on Mount Olivet. But at a much later period, after the barbarous transformation during the dark ages succeeding the fall of the Roman Empire, when the colonnades were walled up and a roof constructed over it, it became the model for innumerable round churches scattered over the face of Europe, as far north even as Trondjem. One of the most important copies, representative of a particular period when such copies were most in vogue, is the tomb-house of Charlemagne, at Aix-la-Chapelle. The more or less documentary history of the great Emperor and of his relations with Haroun-el-Raschid on the subject of Jerusalem, have a bearing on the subject. The eighth and ninth centuries would seem to have been a period during which the circular form of church became again fashionable, and, as a rule, examples belonging to these and later centuries are merely intended to be copies of the Holy Sepulchre Church of Jerusalem in its eighth century condition.

In Spain the arrangement of the choir in the centre of the cathedral, instead of at one end of the building, seems to suggest an earlier style of church plan. In the earliest Roman basilicas the same idea seems to survive; but, of course, in all such cases the buildings are of a square plan. In the interesting octagonal church of S. Giovanni dei Cavalieri, Pisa, the altar remains in the centre of the circular space in the same way as in S. Stefano Rotondo, Rome.

The circular or octagonal baptistries scattered over Italy naturally come under the head of circular churches, but with few exceptions these buildings are traditionally said to have been built for the specific purpose of baptism and as mere adjuncts to square churches. In the Middle Ages such buildings were always fitted up internally with immense fonts, which prevented their use in the ordinary way of a church.

Returning to the more immediate subject of this article—namely, the circular church of Early Christianity, several examples of types unlike the "Torre dei Schiavi" or the "Tor Pignaterra" must be referred to. The Church of S. Stefano Rotondo on the Cœlian Hill, Rome (fig. 10), has been called the "Sphinx of the Cœlian," and its origin remains still a puzzle to some students. Guesses have been made that it was originally built as a circular market, but there is neither evidence nor tradition that it has ever been used for any purpose but that of a church. It is here suggested that a probability exists of its having been originally intended as a copy of the Anastasis in Jerusalem. Its dimensions and the disposition of its inner colonnade bear out this suggestion. At a subsequent period it, like its prototype, was covered over with a wooden roof; at Jerusalem this roof was constructed in some ingenious manner of which no record remains; at Rome it was supported in a clumsy way by a pair of tall columns with arches, which have a particularly barbarous effect. The outer walls and other portions of S. Stefano were much remodelled at the same time the central portion was covered over. In comparison with the great church of S. Stefano, the plans of the two ancient churches of Helena and the "Slaves," already described, are here shown reduced to the same scale (figs. 11 and 12).

Another type of early circular church is represented by S. Maria Maggiore, Nocera (fig 13), and S. Constantia presso S. Agnese fuori la Mura (fig. 14), and S. Toto, or Theodore in the Forum, Rome (fig. 15). The first of these is supposed to have been the Cathedral of Nocera, near Naples, afterwards turned into a baptistry, a destination to which many other circular churches were probably consigned when the requirements of a later age involved the erection of more important buildings as cathedrals.

S. Constantia, Rome, is perhaps one of the best preserved of these early buildings.

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* In a somewhat similar way the modern "Holy Sepulchre," or "Gordon's Tomb," is now protected by a wall which passes all round it, carried along the upper part of the cliff to prevent people from falling over from above.

The position of the altar seems defined by the fact of a large sarcophagus having originally stood behind it, the outline of which is preserved on the floor with a marble border. The well-known decorations of this church belong to a period which is certainly earlier than the time of Constantine, and it is curious to notice certain features in the architecture which recall the debased style of the Levant, such as the curved friezes and vine leaf decorations. It is sufficiently evident this circular church was built in connexion with the adjacent catacombs, and at a later time the Basilica of S. Agnese was added to the group of buildings, but there is no evidence beyond tradition as to the dates of either.

As a result of the above notes upon this very obscure subject we may, perhaps, conclude as follows:—

It would seem that during the first three centuries of Christianity churches were built in spite of possible persecutions, and whilst events were maturing which eventually turned the whole known world over to the Christian religion during the fourth and fifth centuries. Diocletian is accused of having destroyed a conspicuous Christian church which interfered with the view from his palace windows, and from various evidence we are led to suppose the Christians, with whom the Emperors of the early centuries were desirous to curry favour, would not be content to suppress and conceal all outward display of their religion.

Previous to the so-called "Peace of the Church" in the fourth century, the Christian records of whatever kind are confessedly traditional; and, indeed, for many centuries after that event they have but little better authority; it is therefore hardly to be expected that comparatively minor details of history such as the building of small churches should survive. In as far as traditions do survive of the use of certain buildings as churches, they are as good history as any other of that period.

It would seem that where the earliest church builders had an intention to honour a hero or martyr in the sense of a monumental building dedicated to his memory, they adopted the common circular form of similar Pagan tombs or monuments. This did not, of course, exclude the square form, which may have been more generally in use, but did not constitute so monumental a structure, nor so easily escape the modifications of later times.

Apropos of the subject, an ancient tradition may be referred to which records that a certain church of Rome was known in these early centuries as the "baker's oven"—could this name have been applied on account of its circular form? G. J.

NOTES.

The Glasgow Disaster.

WHEN a deplorable event occurs, such as that witnessed last week in Glasgow, representatives of the daily press seldom find time to collect exact details of the kind which interest architects and engineers in a technical sense. At the present moment we are all awaiting information of a precise nature as to the construction of the western terrace at Ibrox Park. Judging from the most reliable reports, it appears that the structure consists of steel stanchions, placed 12 ft. apart in rows which are also 12 ft. apart, supporting longitudinal steel girders, while timber joists extend from girder to girder at intervals of 3 ft., being secured at each end; and, finally, the timber joists are covered by a flooring of battens. In addition to the above, it seems that the structure is braced, though in what manner and with what material we do not yet gather. One circumstance stands clearly out in all accounts of the disaster, namely, that the steelwork remains intact, and that the direct cause of failure was the rupture of some timber joists, which broke in the middle, the ends remaining attached to the steel girders. Moreover, only one section of the floor—about 70 ft. long by 12 ft. wide—system collapsed. Assuming the correctness of the foregoing data, two alternative suggestions present themselves—(1) that the crowd on the undamaged portions acted as a live load of normal character, while the surging mass which swept down the barriers where the collapse occurred acted as a live load of unusual potentiality, overcoming the transverse resistance of sound timber possessing average strength, or (2) that part of the flooring must have contained material that was originally weak, or had deteriorated since its erection. Light will be thrown on these points by the official inquiry shortly to be held, and we shall then probably learn what was the calculated load per square foot, whether due allowance was made for the vibratory and oscillatory stresses inseparable from the movement of a densely packed and excited audience, and whether an ample factor of safety was applied in connexion with the design of the structure. The average weight of a crowd is variously estimated. Some engineers consider 80 lbs. per square foot ample, and others place the maximum weight at nearly 150 lbs. in the same area. In the opinion of bridge engineers, the stresses caused by marching men are fully double those produced by an equal number of persons standing at rest. Therefore it might be necessary to assume the effect of live load on a stand such as that at Glasgow, and with so excited an audience, to be equivalent to 300 lbs. of dead load per square foot. Again, the sudden stoppage of a moving mass of people by barriers or by the crowd in front would inevitably cause severe strain to any structure. Whether sufficient allowance was made for factors such as these we cannot say, and it would be manifestly unfair to prejudge the case in any way. Full information on all essential points will no doubt be forthcoming in due time.

The Rating of Machinery.

WE cannot but think that the recent case of Crockett & Jones *v.* Northampton Assessment Union emphasises the necessity for some such measure as the "Rating of Machinery Bill, 1902," which passed the second reading in the House of Commons this week. The object of the Bill is to exclude certain machinery and appliances, not fixed or only so fixed that they can be removed without necessitating the removal of any part of the hereditament, from being taken into consideration in ascertaining the rateable value of business or manufacturing premises. For many years this principle has been pressed upon the courts, and physical annexation alleged to be the test as to what machinery should be taken into consideration; but it has always been negatived, and in the case of Tyne Boiler Works Co. *v.* Overseers of Longbenton, it was laid down that all things on the premises necessary for the purpose of making the premises fit for the business for which they are being used—or, in other words, all such things as would pass in a demise of the premises as a going concern—are to be taken into account. Such machinery, however, as will be seen from the decision in the case now decided, is not to be separately assessed, and how its presence increases the rateable value of the premises is in each case a question of fact. This question of fact, it is apparent on the face of it, is extremely difficult of determination, yet in both the above cases the courts declined to give any direction as to how it was to be arrived at; hence it is of advantage that a measure should be passed removing this difficulty and consequently ensuring a greater uniformity and equality in assessment.

Wireless Telegraphy.

THE agreement entered into last month by the Canadian Government with the Marconi Companies to establish a Transatlantic wireless telegraphic service proves that Canada is fully alive to the possibilities of the latest development in telegraphy. The great advantage that this system has over the regular cable system is the small amount of capital required. The Canadian Government agrees to pay the Marconi Companies 16,000*l.* to build a wireless telegraphic station in Nova Scotia, and the companies agree not to charge more than 1*d.* a word for messages between Canada and Britain. At the present speed at which wireless telegraphic messages can be sent, not much profit can be made at this rate, and the revenue of the cable companies will be practically unaffected, but there are great possibilities of development. From a theoretical point of view, the difficulties in the way of sending Hertzian waves round the curvature of the earth seem insuperable, yet we believe that in a few months regular communication will be established between this country and America by Marconi's apparatus. The "timing" of these messages will have to be done with considerable precision, as otherwise it is difficult to see how these signals can avoid being registered by the wireless instruments which are now carried by numerous Atlantic liners. The Canadian Government contemplate the possibility of setting up Marconi stations on lighthouses and life-saving stations on the coast. It seems to us that the difficulties in connexion with wireless telegraphy will increase rapidly as the number of stations is increased, but with the improved apparatus now in use there is no reason why the spheres of action of two or three should not overlap.

Fall of a Concrete Floor.

THE collapse of a concrete floor last week at Messrs. Guinness's brewery in Dublin serves as a reminder of the very limited transverse strength of concrete when not reinforced by iron or steel. The floor in question formed part of a disused malthouse which was in process of alteration, and the accidental breaking of a supporting column was immediately followed by the fall of the floor, unhappily killing three men who were in the room below. We do not at present

know the exact details of construction nor the condition of the floor, but apparently the concrete was whole, for it was observed to break into four parts during the collapse. A concrete floor supported by steel joists and girders feels and looks so strong that a natural tendency is to forget that the element of transverse strength exists almost entirely in the steel work. Very few data as to the transverse strength are available, amongst the most reliable being those obtained by Mr. Bruce, M.Inst.C.E., in connexion with the Glasgow waterworks. From these it appears that the modulus of transverse rupture for concrete, as ordinarily used, and at the age of four weeks, cannot be safely taken at more than 80 lbs. per square inch. Comparing this value with the average values of the co-efficients for other familiar materials of construction, some striking differences become evident. One or two simple calculations will show that a concrete slab can only be safely employed for carrying load in addition to its own weight when the distance between the points of support is comparatively small. In fact, the span is soon reached when the slab is incapable of supporting its own weight. This truth has been demonstrated in a most unfortunate manner by the accident in Dublin.

Protection of Lift-shafts.

As lifting mechanism is becoming more and more used in the equipment of modern buildings and dwelling-houses, it is particularly desirable that safety devices should continue to occupy the attention of inventors and manufacturers. One part of this subject has recently been under discussion by the Institution of Mechanical Engineers, when it was pointed out that comparatively few of the mishaps termed "lift accidents" are actually brought about by the failure of mechanism, the majority being due to carelessness on the part of the public or the attendants. This means that the lift-maker must provide against absent-mindedness and negligence as well as against defective machinery. To ensure the safety of lift-openings, it should be rendered impossible (1) for any door to be opened unless the cage is at rest opposite to it; (2) for the cage to be started until the doors are all closed and locked; and (3) for more than one door to be opened at one time. The conditions under which lifts are installed and worked are so varied that it is impossible to contrive any one form of apparatus satisfactorily meeting all cases, but numerous inventions of the kind are available for consideration. Several of these were described in detail by the originator of the discussion, including appliances actuated by movement of the lift itself or put into action by the attendant, and others actuated by hydraulic or electric power. One of the best systems for the protection of lift-openings appears to be the Hollins-Amendt electrical locking gear, and when this is employed the lift cannot be started unless all doors are closed and fastened, no door can be opened unless the lift-cage is opposite to it, and the starting rope must be locked before the door can be opened.

The Fencing of Engines.

In a short paper read before the Institution of Mechanical Engineers, Mr. Henry D. Marshall makes some practical suggestions with the view of diminishing the risk of accidents to the attendants of steam and gas engines. The common device of enclosing the engine within a rail is hardly sufficient protection, and guards should also be provided for all working parts, yet made so that access is afforded for oiling. Mr. Marshall recommends the adoption of automatic oiling appliances whenever practicable, and his paper describes and illustrates several useful arrangements of the kind. In the case of an engine where the flywheel or pulley is close to the wall, means of lubrication should certainly be fitted so that the attendant shall not be compelled to pass an oil-can between the spokes of the wheel, or between the wheel and the wall. The simple expedient of an oil cup at the end of a small copper pipe will answer the required purpose, or a self-lubricating bearing may be used with satisfactory results. The author very properly insists upon the fencing of belting and fly-wheels, and the suggestion that projecting shaft-ends should also be guarded is a good one, for the rotating end —in which there is generally a keyway—is very apt to catch hold of clothing. For a case of this kind Mr. Marshall advises the use of a sleeve of brass, or other suitable material, the sleeve to be fastened to the fencing, or, where there is no pulley outside the bearing, to the side of the bearing itself. Fly-wheels should be boarded up on both sides or shielded by wire-netting secured to ordinary fencing, thus preventing anything from falling into the arms of the wheels. It is to be feared that the protection of small engines is too frequently left to be carried out after the equipment of a building, and the paper to which we refer certainly fulfils a useful purpose in directing attention to the subject.

A Memorial to Shakespeare.

Considerable notice has been taken of the proposal, propounded by Mr. T. Fairman Ordish in a letter to the *Times* of March 29, to erect a memorial in London to Shakespeare. Thus far the project takes the form of a playhouse for which the London County Council would be asked to give a site in their un-named street. An authentic reproduction of a sixteenth-century theatre, say the Swan or the Globe as they stood in the Bank-side, would form a very uncomfortable house for a modern audience, even if, as seems rather doubtful, it could be erected and used without contravening regulations now in force in respect of buildings frequented by the public. Nor is there any particular reason why the theatre should be erected in a part of the town which is not known to possess any association with the poet's residence or career in London. A copy of the Swan, entrusted to capable hands, would be in itself an object of archæological interest; we question whether it would constitute an attraction so great and lasting as to defray the cost of its erection and upkeep as an exhibition or, as some suggest, a County Council museum. On the whole, the proposal, however well intended, seems to us rather a foolish one.

The Artistic Side of Mr. Rhodes.

Under this heading Mr. Herbert Baker, who acted for some time as architect to the late Mr. Rhodes in connexion with "Groote Schuur" and, we believe, other buildings in which Mr. Rhodes was interested, has written an exceedingly interesting letter to the *Times* of Monday, the contents of which will surprise many who saw in Mr. Rhodes only a financier and a politician. According to Mr. Baker, who is an artist himself, and who must have had plenty of opportunity of becoming acquainted with Mr. Rhodes's feelings and opinions on the subject, the great South African diplomatist had the imaginative and artistic sense so developed in him that his whole life was influenced by it. He loved grand scenery; he loved old buildings, and did all he could to preserve the old colonial Dutch farmhouses, and built his own house in a style founded on theirs, as the most suitable to the country. He started a tile manufactory near Cape Town for the especial purpose of "killing the blight of corrugated iron"; he took pleasure in good honest handicraft, and liked having the metal-work of his houses handmade by local craftsmen. Mr. Baker hints at great architectural schemes which were in Mr. Rhodes's mind and might have been carried out in the future had he lived. All this is new reading to many of us; it shows that Mr. Rhodes was a man of much wider nature and sympathies than most persons had supposed, and we are indebted to Mr. Baker for giving this information in regard to one who, whatever his faults, was certainly one of the most remarkable men of modern England.

Basingwerk Abbey, North Wales.

We read that the Flintshire County Council propose to take steps for preserving the ruins of Basingwerk Abbey, which stand upon an eminence, about one mile distant from Holywell, whence is obtained a fine view of the Dee, Hilbre island, Parkgate, Chester, and the Lancashire hills, and rising from the pasture land watered by a stream from St. Winefrede's well. The abbey was founded at a spot close to the northern end of Watt's Dyke, which may be traced in a south-eastward direction to Maesbury, near Oswestry, as early, it is believed, as the close of the eleventh century, and in or about 1131 was placed under the Cistercian rule by Ranulph, second Earl of Chester, who was a munificent benefactor of the foundation. The ruins, which present both Saxon (or Norman) and early English features, comprise remains of the church, the refectory, the monks' cells (each of which has a small window), a chapel added by King Henry II., and a half-timbered building which Grose conjectured to have been the granary. In the neighbourhood are the site of an ancient fort, known as Basingwerk Castle, and the dyke which Offa, King of Mercia, constructed from Newmarket, co. Flint, to Beachley, at the mouth of the Wye.

Gray's Inn Gardens.

Some hopes had been entertained that the Benchers of Gray's Inn would agree to replace the high wall with a railing along the south side of Theobald's-road, now that the Holborn Borough Council are about to lay down Jarrah wood paving in Gray's Inn-road between Theobald's-road and Holborn Bars. It is stated, however, that the Benchers have decided, in the interests of residents in the Inn and of those who are permitted to frequent the garden, not to remove the wall which serves to screen it from the passing traffic. The wall conceals from view on that side a large expanse of turf, with walks and an avenue of elm trees originally laid out and planted by, it is said, Sir Francis Bacon, in

the former Green-court and Panyerman's-close. The records of the Inn contain orders for the payment in 1597-1600 of certain sums and allowances—138*l.* 2s. in all,

"to Mr. Bacon for planting of trees in the walks, ... a supply of more young elm trees, ... a new rail and quickset hedge . . . . upon the upper long walk at the good discretion of Mr. Bacon and Mr. [afterwards Sir Roger] Wilbraham, ... and unto Mr. Bacon for money disbursed about the garnishing of the walks."

According to Sedding's "Letters and Life of Bacon," it was there that Sir Walter Raleigh held a long conversation with Bacon on the eve of starting for his second expedition to Guiana. Along the north side was constructed a raised terrace or mount. The summer-house which Bacon dedicated, 1609, to the memory of Jeremiah Bettenham, Reader of the Inn, was pulled down in the middle of the eighteenth century, and the subsequent erection of Verulam-buildings and Raymond-buildings somewhat diminished the area. The gardens at one time formed a highly-fashionable resort, especially, as Pepys records, on Sundays. They are now the haunt of a great variety of birds that are not commonly to be found in London.

An Absurd Pedestal.

THE *Daily Graphic* gives an illustration, in its Wednesday's issue, of a proposed monument to Goethe to be erected at Rome as a gift from the German Emperor. The statue of the poet is placed on an immense Corinthian capital, with a base added, as if the column had been cut away and the capital and base used up as fragments. Groups of figures (on a different scale from the principal figure) flank the capital. A more absurd misuse of an architectural feature could not be imagined; but this is the design of a German sculptor, Professor Eberlein; and the Emperor "is greatly pleased with it." So much for German artistic taste.

The New English Art Club.

THE exhibition of the new English Art Club at the Dudley Gallery contains, among its collection of unfinished pictures and studies of the ugly, some really good things. Among these is Mr. Furse's fine portrait of Miss Vanessa Stephen (85), her side-face partly reflected in a mirror before which she is standing; a fine work both in character and colour. His half-length portrait of a man (82) is also a powerful work. Near to these Miss Alice Fanner makes a notable success in her "Sketch of a Country Road on a Windy Day" (88), with the clouds flying, trees bowing in the wind, and the line of white posts glittering in the middle distance sunlight; a bit of landscape effect worthy of Constable, and quite in his way. Mr. W. Russell's landscape under the name of "The Lame Horse" (95), and his "Chepstow Castle and Town" (100) are spirited but somewhat rough and "painty" studies; in his interior with a figure, "The Mirror" (118), he shows fine colour and an interesting and pleasing figure. Among landscapes may be also mentioned Mr. Rich's slight but excellent little sketch of "Ipswich Harbour" (7); Mr. Clarkson's "Duckpond" (52), which looks however rather like an inspiration from Mr. Mark Fisher; Professor Brown's "Showery Weather" (54); Mr. Muirhead's "The Avenue" (55), and Mr. Henry's boats "In Winter Quarters" (57). Among other subjects Mrs. Clarke-Hall has an excellent bit of foreshortened figure study (42); Mr. Orpen's "The Valuers" (56) is exceedingly clever and equally repulsive (though in this sense there are much worse things in the room); Mr. W. Rothenstein's "The Amateur" (62) is a study for what would be a very good picture of Mr. Marks's figure and bric-à-brac type—but Mr. Marks used to finish his; and Mr. R. E. Fry makes a curious study of "A Baroque Façade" (70), bastions in the foreground and in the rear an Italian Renaissance building with violently posed statues on the roof. As to various other things in this curious collection, we remember a small "Study of a Head" which ought to do for Bill Sykes; a half length portrait of a lady, defiant in its ugliness both of expression and colour; and two nude studies, one of them so ugly and ill-drawn as to look like a bad joke, the other hardly decent in its prosaic suggestiveness. If this is "new English art," one may well say, "The old is better."

Mr. Simpson's Water-colours.

THE collection of water-colours of East Anglian landscape by Mr. Tom Simpson, at the Modern Gallery in Bond-street, contains a great deal of very pleasant work of, it must be admitted, a rather mannered type, but it is a refined and artistic manner. Mr. Simpson's roads, for instance, seem all to be the same colour—a selected tint. But he is very successful in conveying the character and feeling of the rather blank and desolate scenery of the East Anglia flats and coast scenes. Among the best in this respect are "Opposite Bradwell Point" (13) and "Joyce's Head" (18). The collection is worth a visit, though its interest is of rather a restricted kind; one drawing is very like a good many others.

Landscapes by Mr. Montague Smyth.

AT Messrs. Dowdeswells' Gallery there is a collection of landscapes in oil and water-colour by Mr. Montague Smyth, which are of rather exceptional excellence. Mr. Smyth at all events is no mannerist; he has two or three favourite classes of subjects, but he does not repeat himself; and he has that power of giving unity of composition and effect to a landscape, as if it were the expression of a single governing idea, which raises landscape really to the level of ideal art. As examples of this may be named his beautiful little composition "A Welsh Pastoral" (9); "June Flowers" (14), which quite suggests Corot; and "Gathering Wild Flowers" (20), a work of the same class. Among the others we were particularly struck with one entitled "Low Tide" (45), a small picture with a kind of abstract power and largeness of style about it which makes it impressive to a degree quite out of proportion to its limited scale.

THE ROYAL HORTICULTURAL SOCIETY.—This society, having lately inspected five sites in Westminster, have decided to acquire one in Vincent-square, at the corner of Bell-street. The area of the site, which belongs to the Ecclesiastical Commissioners, is 17,565 sq. ft., and the rent amounts to 690*l.* per annum for a term of 999 years. The society propose to erect a central hall, with offices, library, and a hall for floral exhibitions and kindred purposes, at an estimated outlay of 25,000*l.*, towards one-third of which subscriptions have already been made.

MAGAZINES AND REVIEWS.

THE *Art Journal* gives as its frontispiece an etching of the Houses of Parliament by M. Brunet-Debaines, but the building is only used as an element in a moonlight effect (we presume it is intended for moonlight), and is rather maltreated. Mr. Claude Phillips continues his articles on the Wallace Collection, treating in this number of the French pictures, and giving illustrations from Prud'hon, Ary Scheffer ("Paolo and Francesca"), and including the beautiful "Villa Doria Pamphili" of the last-named artist; of its true power, however, no idea can be formed apart from the colour. We wish Mr. Phillips could tell us what has become of the best of all the Decamps that Sir Richard Wallace had, viz, "The Patrol at Smyrna." We remember it when his collection was exhibited at Bethnal Green, but it is not at Hertford House. The second part of Mr. Austin Dobson's article on Kate Greenaway is accompanied by a profusion of little sketches that are exquisite, as Miss Greenaway always was when she kept within the province of art for which she had a special faculty; when she went beyond that and attempted pictures she failed. Mr. Charles Quentin contributes an article on Rodin's latest works, of which "Les Nuages" is a really fine conception; the article is written in the vein of adulation for this unequal and erratic sculptor which is now the fashion. The *Easter Art Annual* connected with the *Art Journal* is devoted to the life and works of Rossetti. The illustrations are numerous, and present some designs that are little known. It was a right choice to give a whole plate to the little triptych of "Paolo and Francesca," for all that is strongest and most individual in Rossetti's art is symbolised in this work. The article is written by a lady relative of the painter, and therefore one cannot very well expect to find an impartial critical estimate in it. Rossetti was well worth a special publication of the *Art Journal*, but his paintings will not ultimately take the place that his friends and admirers expect.

The *Magazine of Art* devotes an article to the art and the works of Mr. Somerscales, a sea-painter who not only paints the sea with great force and power, but who understands sailing-ships as no other English painter understands them. We are not surprised to learn from the article that he has been many years constantly at sea, not however either as sailor or artist, but as a schoolmaster in the Royal Navy. Painting as his main work came as an afterthought, and certainly he has made fine use of it. A long article on the work of Miss Fortescue-Brickdale is illustrated by a variety of reproductions from her studies, including figures, animals, and farm buildings, all equally well treated. Under "Notes" is given a small illustration of a part of the London County Council Engineer's design for Vauxhall Bridge, and under it a similar portion of Mr. H. H. Statham's suggested design; the two reduced to the same scale. We recommend this comparative illustration to the notice of those who are interested about the treatment of Vauxhall Bridge; we think it will be admitted that the two form a rather effective object-lesson.

The *Artist* seems to have started a new *format*, though not a new series. It presents a new cover, not quite as good a piece of design as an art paper should show, and special designs on a dark brown paper as headings to the principal divisions of the number—either decorative designs or special coloured illustrations. These are mostly very good. It has also added a department of musical criticism to its contents. A paper on Holbein by Mr. Bensusan, very well illustrated, forms the first article; followed by one on the work of Mr. Moffat Lindner, who, though mostly known in exhibitions as a landscape painter, interests us by a number of very good though slight architectural sketches introduced as illustrations to this article. "A River-side House," designed by Mr. H. Seton Morris, is the subject of an article and illustrations; though a nice little house in the "civilised hut" style, it was hardly worth making the subject of an article. We notice that in some of the art papers there seems to be no interest in architecture except in the form of a civilised hut—as if this kind of thing specially represented the artistic side of architecture; which is surely not to be admitted.

The architectural illustrations in the *Berliner Architekturwelt* are more interesting and (to the English eye) less eccentric than usual.

Two or three competition designs for the reconstruction of the Exhibition buildings at Berlin show some striking architectural conceptions. The new Rathhaus for Schmargendorf, by Herr Otto Kerwein, is an effective feudal-looking building; and the apartment-house in the Matthäikirchstrasse, by Herr A. Messel, shows a sober and dignified treatment rather belonging to the old than to the new German school of architecture. The latter is represented by MM. Meier and Werle's "Villa Swoboda" at Steglitz, with a clever plan and an architectural treatment that is at all events not commonplace. Herr Lederer's public fountain for Breslau is a fine conception; though rather coarse in detail, it represents some of the best qualities of German sculpturesque design.

The *Monthly Review* publishes the first part of an essay by Mr. T. A. Cook, under the bewildering title "The Shell of Leonardo," the object of which apparently is to prove, or rather to show it probable, that Leonardo da Vinci was the architect of the celebrated spiral staircase at Blois, and that he took the idea from the construction of a spiral shell. The present article is entirely occupied with the rather unnecessary process of showing that there are many spiral forms in nature, which no one ever questioned. All this seems a revival of the old fallacy of architecture derived from natural forms, which no one who has studied the development of architectural structure can ever believe in, except merely in regard to a certain amount of decorative detail. Structural forms in architecture are developed by structural problems involved in the very act of building. It does not seem to have occurred to the writer of the article that if a staircase is enclosed in a circular turret—a favourite form from its concentration in regard to spacing—the lines of the ascending steps necessarily form a spiral; every common circular turret staircase is a spiral; that at Blois is only one more boldly constructed and more artistically treated than most others. The article is, in fact, one of those faddist articles about architecture with which English literary editors—than whom no class of educated persons are more ignorant of and indifferent about art—are so liable to be taken in.

The illustrations in the last issue of the *Architektonische Rundschau* present nothing of special interest; the front of a house in the Lützowplatz at Berlin, by MM. Kristeller and Sonnenthal, shows that there are still architects in Berlin who can appreciate a broad and severe Classic treatment of a house front, and of its class this a very good design, owing much of its effect to the contrast between plain rusticated treatment of the lower two stories and the graceful applied order above. English architecture, as usual is entirely ignored in the so-called "Rundschau."

In *Macmillan* Mr. Lewis F. Day writes a paper on "Art and Life," an exceedingly sensible and well-balanced consideration of the relation of the artist and the artist life to society at large. While holding that an artist to do his best, must keep his life to a great extent free from the bondage of many social conventions, Mr. Day is broad-minded enough to realise that there is such a thing as over-acted and insincere Bohemianism, and that the artist who assumes an attitude at war with society and life as it is lived, is apt to lose more than he is aware of. Coming from an artist, the paper is a very good and well thought-out criticism of the relation of the artist to society.

The *Nineteenth Century* contains an article by Dr. Edridge-Green on "Colour-blindness." According to him there are two classes of colour-blind persons—those whose sight loses light as well as colour, and those whose light perception is normal but whose colour-sense is deficient. The article deals only with the latter class. The writer had a very exceptional opportunity of studying the subject with the assistance of a patient who was colour-blind with one eye, but not with the other. This enabled him to compare the appearance of colours as seen by the colour-blind eye with the actual (or usually perceived) colour. The difficulty in getting at the appearances of colours to colour-blind people is that they do not know how to define the shades or tones they see with reference to actual colour which they have never seen. The most interesting point in the article is the conclusion which the author has drawn from his studies of the subject, viz., that the perception of colour is an acquisition of civilised man; at all events that it has very much developed ever since the days of Homer, taking account of the small number of colours mentioned by him (or it). The practical side of the article is that Dr. Eldridge-Green finds that only a minority of persons can see all the colours of the spectrum; those who are "pentachromic" or "tetrachromic" (who can see five or four colours) he classes as normal. He mentions that in the ordinary tests employed by railway companies and the mercantile marine those who are trichromic are allowed to pass; but, he says, "This is not right, as those who are trichromic are always in difficulty over yellow, though they distinguish red from green easily enough." This is, or might become, a very serious matter, considering that engine-drivers have to govern their movements by the difference between red and what, though called "white" lights, are practically yellow.

In the *National Review* Mr. W. Robinson, under the title "The Garden Beautiful," criticises Mr. Inigo Thomas's book on formal gardens, from the usual landscape-gardener's point of view, and says the usual things on the subject which landscape gardeners always say—"Is not this our craft in danger to be set at nought?"

In the *Century* an article on "The Beautifying of Village and Town," by Mr. Sylvester Baxter, is chiefly interesting to English readers as giving evidence of a new movement in this respect in the United States. The writer seems to imply that there is much to be done in this direction in America, and that there is an awakening of public opinion on the subject. He gives a sketch of "a commonplace village street" and of "a well-ordered village street"; they are effective contrasts, and we presume the latter sketch, with its wide margins to the roads and its trees down the roadside, represents an ideal to be aimed at. But in many country towns and villages in England this kind of "well-ordered village street" can be found as a natural growth; it has made itself, without any theories or ideals at all. In our large cities it is otherwise; we have much to do to beautify them; they also were probably beautiful in an earlier stage of their existence; the march of civilisation and of "street improvements," carried out on purely commercial lines, has spoiled them. And one of the worst things about our large towns is the manner in which dirt or litter are left about in the streets, with no systematic effort at cleansing them. In this respect London is as bad as any—perhaps worse than most. The following remarks by the American writer are worth studying by our County Councils:—

"First in order in activities of this kind comes cleanliness. Clean streets and public places, clean private premises—with these secured, the first great transformation in the community takes place. When nuisance-breeding rubbish-heaps are cleared away, and vacant lots covered with all sorts of litter are cleaned up, everybody notes the improvement and is interested in seeing it maintained. Orderliness, of course, goes hand in hand with cleanliness. The latter cannot be secured without good order. And with good order there is an aspect of neatness that commands popular respect. It pleases the public eye. Nearly everybody will desist from throwing rubbish into a well-kept place, and from scattering torn up paper or other litter in a clean street. Public sentiment is easily cultivated in favour of public cleanliness and order. . . . . Good streets and sidewalks, clean and smooth, are among the best tokens of advanced civilisation. Cleanliness means health, and smoothness means the economy of energy — human, animal and mechanical—which is equivalent to economy of money. Every little unevenness of surface presents a corresponding push against energy expended, amounting to enormous aggregates of wasted force in the course of a day. For instance, there is probably less fatigue from walking three miles over a smooth sidewalk, any of artificial stone, than from one mile over an uneven walk of stone or brick. The final aim is the achievement of beauty. To this cleanliness and order lead. Without them there can be no real civic beauty. They stand at the base of it, and give the good surfaces and true lines from which beauty is developed."

It is interesting also to learn that half a century ago a special move in the direction of beautifying was made by a small town in Massachusetts, Stockbridge by name, at the instance of a lady—Miss Hopkins, afterwards Mrs. Goodrich—who organised a society for promoting the beautifying of the town. The example of Stockbridge was followed in other villages in the State; and moreover, it was found that it was a paying policy—"every dollar expended for beauty brought thousands back": surely a lesson worth recording and remembering. The frontispiece to the number is a fine translation of a portrait by Velasquez into wood-engraving, by Mr. Timothy Cole, whose engravings from the old masters we have so often noticed.

From a short article in *Scribner* under the heading "The Point of View" we learn that in America, as to some extent in this country, the question of the evil of preventible noises in cities is in course of being considered and taken up seriously. Under the heading "The Field of Art" are "Some Notes on Pattern-Making—by a Bookbinder," which are sound and true in spirit, but contain nothing that has not been said before. We quite agree with the writer in deprecating the rather increasing tendency to decorate bookbindings with realistic foliage or other representations, in place of conventionalised ornament designed for the space which it is to fill.

Harper contains an artic'e by Dr. Morris Jastrow on the recent work of the German explorers on the supposed site of Babylon. The article is entitled "The Palace and Temple of Nebuchadnezzar," and gives plans of the site and excavations, together with a fine chromolithograph of one of the figures of lions in bas-relief in coloured tiles which has been restored from the fragments found and put together. The lion figures apparently formed two rows of coloured sculpture on each side of a processional road, with a rosette frieze above them. Mr. Bertelle M. Lyttle contributes an article on "Recreations in Cartography," a study of the beginning of map-making, with reproductions of some very curious maps of early date—early, that is, in the history of map-making. The knowledge of the true outlines of land on the globe is, comparatively speaking, of very recent date. An Anglo-Saxon map of the world, of the tenth century, is an odd compound of a little basis of fact and a great deal of imagination. The relative positions of Great Britain and Ireland, for instance, are given with approximate correctness, but England and Scotland are joined at a right angle, the latter extending round the south of Ireland. There is a crude representation of the position of France and Spain, and of the Mediterranean and its archipelago, which come nearer the truth than one might have expected for that date.

The *Pall Mall Magazine* contains an article on the now constantly recurring subject of the Panama Canal, of which the most valuable item is a section of the route, shaded to represent what has been cut by De Lesseps' Company, what by the present Panama Company, and what remains to be done. The article, by Mr. J. Geo. Leigh, is a historic, not an engineering one. Mr. Douglas Freshfield contributes an account of "A Holiday Tour in the Himalayas," with some fine illustrations from photographs.

In the *Engineering Magazine* we again come across the Isthmian Canal scheme, treated by the same writer as in the *Pall Mall Magazine*, Mr. J. G. Leigh, with the same conclusions and some of the same illustrations. A wise and thoughtful article by Mr. Percy Longmuir, on "The Possibilities of a New Trades Unionism," has for its main object to suggest that trades-unions should go beyond the mere question of fighting for least work and highest wages (that is our summary of the situation, not the writer's), and make it part of the business to assist the general education of the workman, and his interest in his work. Mr. Longmuir adds:—

"Should any units of this mass show by special talent, aptitude, or inclination, a fitness to enter the lower branches of skilled industry and so work upwards, then give them every chance to do so, and not, as is now the case, close every avenue of approach save one and crush every spark of ambition in men who may unfortunately have had no early chances."

In *Feilden's Magazine* the subject of the Isthmian Canal again appears, and again by the same author, Mr. Leigh. We wonder how the editors of the three magazines to which he has contributed practically the same article appreciate this system of duplicate, or in this case triplicate, contribution.

In the *Essex Review* appears Part IV. of Mr. Glenny's historical essay on "The Dykes of the Thames." We hope this will ultimately appear as a separate book; the subject of much interest, and is very well treated by the author.

In the *Antiquary* Mr. T. Sheppard's "Notes on the Antiquities of Brough, East Yorkshire," are continued. Mr. Sheppard supports the view that Brough is the site of Ptolemy's

"Petuaria"; for his reasons we must refer the reader to the article. Mr. J. Russell Larkby gives two sketches from Catherington Church, Hants; one of a wall-painting of "St. Michael Weighing Souls," the other of a much weathered Norman Calvary which has been set up against an angle of the church; a most unsuitable position as we quite agree; it should have been set up as a separate object standing free, as it no doubt originally did. The first of "Notes of the Month" records a very interesting discovery of vestiges of lake dwellings in a field at Colemere, near Ellesmere, Shropshire, on a site which is still very marshy.

The recent interest in aërial navigation is marked by the appearance of a new quarterly magazine devoted to the subject, under the title *Flying*, of which the second issue has been sent to us. It contains full information in regard to the most noteworthy recent experiments, that of M. Santos-Dumont and other aëronauts, with numerous illustrations.

The most interesting feature in *Knowledge* is a fine illustration of the telescopic appearance of the planet Mars, to which so much attention has been drawn lately; it accompanies an article by Mr. Antoniadi on "Recent Observations of Mars," with a number of other illustrations of the face of the planet as observed at different times. Mr. W. Maunder continues his essay on astronomy without a telescope, treating this month of "The March of the Planets."

The *Gentleman's Magazine* includes an article on "Bells," literary rather than scientific, but not uninteresting.

HOUSE BUILDING.*

VIOLLET-LE-DUC, in "l'Habitation Humaine," traces the art of house building from its earliest beginnings. He draws a picture of the primeval inhabitants of the earth crouching for shelter beneath the overhanging branches of friendly trees, and shows the first stirrings of the building instinct. He very truly emphasises the fact that the practical requirements of warmth and shelter first awakened this instinct.

But man is not the creature of a single idea—joined with this purely practical art of shelter making is a mysterious and undefinable desire to make things beautiful. Leaving behind these misty ages, and passing on to the times of which we have recorded history, we still find this dual sense at work; men, putting up buildings exactly to their requirements, and full of an inimitable beauty; buildings which now, after the lapse of centuries, awaken in us the most profound admiration. We find this beauty and fitness, not only in the large and monumental buildings, but in humble structures, and household furniture and utensils. The art of house building developed slowly, but it was always a natural development, exactly supplying the wants of the people. In the time when life and property were insecure, people housed themselves in such a way as to be safe from attack. Then when a less rude age succeeded, and a more reposeful life became possible, the austerities of the castle disappeared. Home life and all that it implies was expressed, but always, men built their houses just as they wanted them, in a natural, straight-forward, every-day way.

Let us now come to our own times, the great "age of progress," and what has become of the art of house building? English people are accustomed to boast that the love of home is peculiarly English. Nowadays it is, indeed, difficult to sympathise with this sentiment, for anything more unlovable than the average English house it is impossible to imagine. I would rather not believe that people really take a pleasure and delight in anything so unworthy, but I fear the evidence is too strong to be at all in doubt about it. In spite of education, in spite of everything that should make for it, a natural healthy taste is not to-day a national possession. Some evil spirit is abroad which "makes us to have a wrong judgment in all things;" our ordinary homes and all that they contain are, I believe, more tasteless and unmeaning at the present day than ever before. Things of simple form suitable to their uses have been discarded for formless abominations, further disfigured by machine stamped "ornament;" and it is no exaggeration to say that in thousands of houses there is nothing worth its making, from cellar to garret.

The reason for all this is not far to seek. Modern conditions of labour have made a national art impossible. This is not, perhaps, the place to speak at any length on the organisation of labour, or the master and man system of to-day—it is difficult to avoid it altogether, as the decay of the builder's art is really the outcome of this system. We may, however, I think, take it for granted that a natural architecture growing out of the actual work of a community is dead; but we are always told that out of death comes life, and architecture in dying has brought forth the architect, and made him the heir to some at least of her secrets. We may pine for the days when architecture was a living art, but it is no good to wring our hands and sigh our lives away. It is better for us as architects to define clearly in our minds how we are going to use our small inheritance. It is anyhow easier to do this than to remake the world!

We may, for the sake of argument, divide modern architects into two classes. Those who look for a development of an intellectual architecture—an art based on style learning—and those who argue that as all *living* architecture has grown out of actual building, the nearer they can approach similar conditions the better is the chance for a natural and legitimate expansion of the art.

The "Intellectuals" present a strong case. They may state it somewhat as follows:—Architecture has grown through generations with the growth of the people, and has now crystallised into a definite and expressive language. This language can be learned, and architectural compositions can be produced of more or less beauty according to the scholarship and skill of the architect. This seems a very reasonable theory, and certainly fits in with the conditions of modern times; but has it borne good fruit in practice? It has now held the field for many years, and are we, do you think, any nearer to the promised land? Don't we find that, so far from this language of architecture being learnable, it is a very Babel of Confusion, a language which changes its form and grammar every decade almost? Greek, Roman; Gothic of all periods, one after the other, and at the present day a jumble of everything!

The case for the other side is not so easy to state. Let me put it as clearly as I can. Granted that architecture has grown out of the actual processes of building carried on under natural conditions, that the styles, as we call them, represent the high water mark of the builder's art at each period, and that just as these conditions changed, and skilled labour was forced into unnatural grooves, architecture declined; therefore it is but reasonable to infer that it can only live again on the same terms. Let me quote here part of a lecture delivered by William Morris to the students of the Birmingham School of Art in 1894. Referring to the beautiful English villages, now fast being destroyed, he says:—

"Keep your village houses weather-tight, trim, and useful, and, where you *must*, build others beside them; but why, when you build these, should you make them specimens of the worst buildings in the worst suburbs of a modern town? Even in the passing day, if you build them solidly and unpretentiously—using good materials natural to their country side—and if you do not stint the tenant of due elbow-room and garden, it is little likely that you will have done any offence to the beauty of the countryside or of older houses in it. Indeed, I have a hope that it will be from such necessary, unpretentious buildings that the new and genuine architecture will spring, rather than from our experiments in conscious style more or less ambitious."

And further:—

"Now this matter of the proper understanding of architecture is at the present moment of such overwhelming importance in the consideration of the future of the arts that I must say a few more words about it, even though it be in parenthesis. I mean in plain terms that the manner in which our buildings, and especially our houses, are built is really the foundation of the whole question of art; and that, if we cannot build fit and beautiful (not necessarily highly decorated) houses, we cannot have art at all in our days."

These are weighty words, both inspiring and depressing. If any man may speak with authority, surely Morris may. In the making of all sorts of fabrics and wall papers, "Architecture in little," as he may have called it, he actually invented the "new style," which has been vainly demanded of architects for many generations. And how did he do it? Emphatically not by learning an old style and composing in that acquired language, but by going to the root of the matter and learning how to make things with his own hands. He recognised the very simple truth that everything grows and expands from its *roots*. Is it unreasonable, therefore, to suppose that architecture must follow this universal law?

I have put before you two views. First, the development from style learning; and secondly, the development from actual building. The first has been tried with varying success, but without so far any very definite results; and although much interesting work has been done on these lines by men of really great talent and endowments, I think you will agree with me that we are as far off as ever from anything like a national expression in architecture. The second view is sound in theory, but unfortunately the machinery is wanting to put it in practice. For us architects to throw away our T squares and take to the chisel and the trowel would be useless. What little influence and what little power we may have to mould modern architecture would be lost, and the gain would be nil; we should simply be a handful of third-rate bricklayers and masons, with a very poor chance of a "job" even with a speculating builder. The words of William Morris indicate a middle course.

I have called the modern architect the heir to some of architecture's secrets. I mean by this, that so far as that is possible, he is the representative of the old builders; that born in him is the instinct to build, and that he should develop this instinct, and turn his mind to architecture as the art of beautiful building.

These definitions leave me with an uncomfortable feeling that I have been at great pains to explain the difference between Tweedledum and Tweedledee, and that, after all, the result will be much the same whether we study and practice architecture as style composition or as building. That is possibly true up to a certain point. The visible difference may not be great, but nevertheless I believe that if we accept this view, and try to develop architecture on the lines I have indicated, we are on firm ground; and that if we take our materials, see where they lead us, and what we can do with them, and let them help us to make our house-building rational and beautiful, there is here at any rate the germ of growth, and we shall make something more of our art than by pursuing the language of style method. Anyhow, I am content to advocate that view. I feel that we should do all that we can to master the science of building and know the possibilities and the proper uses and limitations of materials, and if we use these wisely and properly, with such quiet good taste as we possess, and plan our house sensibly—not shirking any one of the practical building problems that confront us, but making of them opportunities for the exercise of our skill, and what we have of the instinct for beauty—we shall, I believe, achieve the best results which are possible for us at the present day.

Let us now analyse one or two old buildings and see how much we can get out of them, and how far the builders' recognition of the exigencies of climate and material have given them their special shape and character. A Yorkshire house suggests itself as the first subject for our analysis. We find it built of stone, that being the material nearest to hand. The stone is used in good blocks, of such a size as to be handled without undue difficulty. (I have seen, by the by, many modern houses in Yorkshire where the stone is chopped into little courses and made to look like bricks!) A rigorous winter demands a stout wall and the builders provide it. Slabs of stone—the natural material again—form the roof. Hips and valleys are difficult to manage, and so we find that nearly always a simple unbroken span covers the whole building; the pitch not too steep or the heavy slabs would fall; eaves only slightly projecting (a great projection would overtax the unsupported rafter feet), and there we have the typical house, so far at least as we need analyse it to show my meaning. Where bricks and tiles were the available materials their use similarly influenced the shape and character of the houses. Hips and valleys present no difficulties; and gables and irregularities of plan were freely used. Clay, chalk, wood, lath and plaster, all are pressed into the service in default of other material and all take

* A paper read before the Leeds and Yorkshire Architectural Society on Thursday, March 13, by Mr. Ernest Newton.

the shape proper to their uses. When thatch of reeds or straw formed the roofs, the old builder unerringly grasped its capabilities and with admirable ingenuity covered his building. We could go on indefinitely, but I have I hope said enough to indicate the lines on which we might go in making houses ourselves.

Having then decided in our own minds that we will approach house building on these lines, how shall we set about it? First, I would say, let our houses be English, and let them, moreover, be local. As the characteristics of all houses, in all times, have largely been determined by climate, by the usable local materials, and the practical requirements of those who were to live in them, let ours be determined by the same factors. Here, at the outset, I admit we are met with a difficulty. Few people now have any requirements at all except cupboards, which seem to be the one clearly-defined desire of the English housewife. The man may want a "den," and out of the den and the cupboards the architect has to make his house. Fortunately, there are certain "constants" in house building, all commonplace and ordinary, but of sufficient importance to shape our home. We must in England have solidity, sunlight, and a roof that will throw off snow and rain. Here are the ingredients for a good house. Now, let us plan it in a simple, straightforward manner. Do not let us annex the features of old houses wholesale (features which perhaps grew out of a building problem proper to that house only), but let us make our own "features" out of our own requirements and difficulties, always remembering that there is an art of "leaving out" as well as of putting in. We ought not, either, purposely to make our houses look like old ones.

I do not want to be misunderstood here and to appear to advocate starting from nothing—we have seen in what, I believe, is called the "new art" where this may lead us! We are heirs to certain possessions, and until and unless circumstances should require the invention of new forms we shall rightly and properly use old ones; in fact we *must* whether we want to or not, but let us know what we are using and why we are using it, and rigorously exclude anything that we do not want, or do not understand.

Just a word on sculpture and painting. Our houses ought to be further adorned by painting and carvings, but, unfortunately, painters and sculptors devote themselves almost exclusively to easel pictures and portrait busts. They are also very exalted people, and would not, I fear, consent to add to the beauty of our ideal house, unless it were one of some magnitude with a reward in proportion. We are better without any, than with cheap makeshifts which do not adorn, but merely irritate.

You will think that this building architecture, based on the constructive and proper use of materials, does not foreshadow any very great or brilliant achievement—well, perhaps these are not the days of great and brilliant expression in architecture; but I believe that if we tackle the problem on the lines I have sketched, we may not, perhaps, build houses worth a pilgrimage to see, but we shall, at any rate, build them so that they will fit in with their surroundings modestly and quietly, instead of proclaiming to all who pass by that although they may bristle with "correctness," and vibrate with "hall-marked" detail, they mean nothing, express nothing, and are merely good building material misapplied.

I have noticed in all papers which deal in any way with modern architecture that it is considered right to devote a part to what are called "practical points." I now therefore follow traditional precedent. Of what I have called the building "constants," the roof is on the whole the most important. It is not difficult to plan a house that is solid, convenient, and well lighted, but which cannot be covered without flats and snippets of roof. It is, therefore, not a good plan. The proper covering-in of buildings has exercised the minds of builders from the earliest times, and the skill with which this has been accomplished has been the measure of their achievements. Then, as to windows, while we must have enough sunlight we must not have too much. Time and use have sanctioned windows of almost any proportion—height greater than width, or width greater than height; but in the subdivisions we find each separate light higher than it is wide. There are many practical reasons for this. Lintels require support at frequent intervals; casements or sashes are more easily hung and worked when their height is more than their width. Other reasons may occur to you, but I think we may take the main facts as settled, and not trouble to work out the whole thing "from the egg" again. The high-shouldered transome is quite a modern invention. In old windows it was very little above the middle line, and so strengthened and tied the mullions just where the strength and tie were wanted. The position of the windows is naturally most important, but no rule can be laid down for this. Speaking generally, we may say that if the house is well planned, and the windows put in the best positions in each room, they will be right and will look right. Again, the type of window will very much determine the character of the house.

Let us suppose that we are going to build our house in a very sunny position, and would like to be able to temper the sunshine with shutters fixed outside—obviously, if we want to open the windows when the shutters are closed we must have either casements opening into the room, or sashes. The sunny aspect is also the rainy aspect, and as it is difficult to keep such casements weather-tight, we decide to use sashes, and we shall find that our choice of window will determine, to some extent, the proportion and character of our house inside and out.

Then the projections of parts. Do not let them be too small or they will look glued on. One sees sometimes a gable on a house front that has been contrived by a projection of about a foot. Rather than do this, if you must have the gable, have it without the projection. I would say, also, avoid unnecessary buttresses at the angles of the building. These have crept into our house building lately; they are not wanted, and, instead of adding to the apparent strength of the house, they look like struts put up in haste to prevent it from tumbling down.

We must by no means neglect the colour and texture of our materials; if we use stone, let it be good weathering material, bedded according to its depths in the quarry. The walling plays a very important part, and must be considered practically and built naturally. If we use bricks and tiles, let us take care that they are pleasant in colour and surface. The manufacturer's ideal brick, like cast iron in texture, and of an anæmic and unpleasant colour, and a vitrified and volcanic looking tile, are practically impossible. I doubt if an archangel could successfully wrestle with them, but if they are the only bricks and tiles we can get without importing, we must do the best we can with them. It would be quite allowable to whitewash the bricks. Thin blue slates are even more difficult to deal with. They are, at any rate, only possible architecturally in their own district, and it is a waste of good effort to import them. Half timber work should only be used where it is the sole possible method of building in a locality; and then genuinely accepting all its difficulties and drawbacks; used as a sham piece of make-believe picturesqueness it is quite indefensible.

Our rooms may be any height, but if they are long and narrow, they should not be too high: arbitrarily to lay down a rule that *all* rooms must be high, or all low, is, of course, absurd.

Professor Kerr, in his "English Gentleman's House," gives some excellent hints on the placing of doors, windows, and fireplaces—small details not to be despised. The perfect house is to be perfect all through, and is to be comfortable to live in, as well as comely to look upon.

I am afraid you will think that what I have said is all very commonplace and tame, that I have really said but little about the art of house building, and nothing at all about grouping, proportion, and light and shade. I must confess that I find the latter too elusive for analysis, and I have tried to evade the difficulty by picturing man as possessed of two building instincts, the practical and the æsthetic; and these, working as one, leading him to produce architecture—and there I must leave it. As to the rest of my short paper, I can only say that I have done my best to grapple with a subject of some difficulty. Architecture is in a transition stage. The style theory somewhat discredited, the natural channel of development through actual building denied to us, we have to find some rational method of architectural expression, and this I have tried to indicate; what the future holds I would not venture to predict, but for the present I would say, let us build honestly, soundly, and sensibly, with a definite intention to make our houses as beautiful and expressive, in every sense of the word, as we can, and we shall have done all that we are now able to do, and may with a quiet conscience leave the future in other hands.

MODERN TREATMENT OF STREET ARCHITECTURE.*

A WHOLE-HEARTED acceptance of the doctrine of a frank modernism of design and construction in business premises by architects, is sufficient requirement to make of them for the establishment and growth in our midst of a healthy street architecture, which, expressing the movement of the age in its requirements, will reflect the intellectual attitude of trained and artistic minds applied to a commercial problem in building. The profitless and stupid antipathy that is supposed, and partially exists, between commercial and artistic character, should thus, at all events in architecture, cease to be confessed, and having reformed the attitude of art to business life we can the more sincerely and successfully hope for and attempt the resuscitation, for it once existed in pure and noble beauty, of living art in the commercial world.

The employment of modern materials, and the joyful acceptance of current requirements as a means of expressing a progressive architecture, will, however, bring the architect into conflict with other ideals than those merely of an archæological correctness or antique style. Serious problems in design, nearly all as yet practically unsolved, await him when the first and upper floors have to be designed over and upon a lofty ground floor shop, the front part of which occupies all the clear space between the ends of the bounding party walls on each side.

It may be taken as a canon of architecture that buildings must not only be of a construction that is secure in itself, but must be obviously so, and that a building, however scientifically safe, will not be architecturally satisfactory to the eye and mind unless it also appears to be safe. Doubtless time is a great convincer in matters of artistic criticism, and if a sufficient number of examples of a novel method of construction were put before the world to manifest to it that what is apparently unsafe, perhaps hung upon nothing, is after all perfectly secure, and scientific as well, after a time this canon of architectural criticism would be satisfied in spite of itself by the relation of experience to judgment, and the disappearance of that distrust of novelty which is a gift of Providence to save men from calamitous experiment.

We should have become accustomed, perhaps, by this time to seeing great and massive erections of weighty stone and brickwork poised upon the slender brass pillarettes, lace-like arches, plate-glass fittings, and mahogany fascias of shop fronts; but we are, I am sure, suffering artistic discomfort, and deriving no pleasure from their carved and ornamental blandishments, owing to the initial hiatus that the system of architectural design employed demands a basement and obvious foundation, and has none. With this difficulty the modern architect wrestles ineffectually; the implements of his trade were all made for buildings with bases, and he knows not how with them to fashion a modern design without obvious support. The difficulty is everywhere self-confessed, and causes an infinity of interesting and sometimes amusing expedients. The projection of the shop front beyond the general face of the upper stories of the front, thrown out so to speak as a screen beyond it, is a device only very partially successful; it has a certain sufficiency when the shutters are down, but modern progress is depriving the shop architect of this scrappy resource for architectural effect at close times, and on Bank and half-holidays. The void is there, gaping all the week, with perhaps the flimsiest draperies depending from the ceiling within it, dispelling all illusion as to supporting a very mine of weight overhead. The emphasising of the end piers which mask the party wall ends, and the development of a cornice with the shop fascia to connect them and form a horizontal bridge, on which the upper part is carried, is frequent. This should be a more satisfactory method, as it would disregard the shop front

* Part of a paper read before the Applied Art Section of the Society of Arts, by Professor Pite, on Tuesday, the 8th inst.

and its contents, and dissociate the composition of the upper stories from the lower ones. The failure, however, occurs in that the establishment by this treatment of a factor of architectural proportion integral to the whole front has as yet failed to obtain recognition. The architect supposes that the business has been completed, and proceeds in designing the floors immediately over to dispose his proportions in the traditional way employing lintels and openings of ordinary narrowness, each of which is unconsciously engaged in defying the exaggerated yawn of the cavern below spanned by a member of their own architectural family under abnormal conditions. It may be more easy to point out than to demonstrate that the system of proportion compelled by the ground story should be recognised in the design of the upper ones, and though openings above are not required of the extent of that below, there is a logical symmetry of spacing which would take the first factor, and by progressive reduction or systematic subdivision apply the scale and diminish the proportions harmoniously with satisfactory results.

We have referred to the usual treatment of the shop or ground-floor story by supporting pilasters and a carrying cornice with a reversion to ordinary proportions in the upper part, but the treatment of the story over the shop front as a mezzanine or *entresol*, and as part of the shop front, must not be omitted. A few years ago it was more commonly used as an architectural device for getting over the difficulty of affording apparent support to the upper part than it has been of late years—the latter developments of shop design having a tendency to make two stories of shop fronts extending over an area of plate-glass unbroken by constructive lines, over nearly half the elevation of the building. The mezzanine proper was enclosed by an arch springing from the side pilasters at the level of the head of the shop front, and spanning the whole frontage, if one of ordinary narrowness, rising to the underside of the floor over the mezzanine; thus an arch is gained of considerable size, and at first sight of some capacity, not only for carrying the upper stories, but of blending the smaller scale of that part gradually and harmoniously with the ground floor.

For single house and shop fronts this method has not proved very successful. It can be easily imagined, and indeed seen in many examples readily called to mind, that a large arch springing from narrow pilasters on the extreme limits of a frontage gives the impression that its thrust must be acting upon the neighbouring buildings—in the most likely cases also shops, and appearing to crush them. The initiated will, of course, understand that this will not actually happen, as the arch is more apparent than real, the weight of the upper building upon it being probably carried on a concealed horizontal girder behind the crown of the arch. The success of the arched mezzanine treatment therefore depends largely upon its neighbouring abutments, and unless these are controlled by the same designer or pre-exist in a satistory way, the experiment is very risky. Instances can be cited in very modern London of lofty and powerfully-drawn arches of brick and stonework carrying with apparent scientific and architectural balance a series of upper stories, but conveying their weight by every optical demonstration of mechanical law against the plate-glass expansion of a neighbouring elevation of the picture-frame order.

The *entresol* arch is also dependent for complete effect upon a sufficient reveal or exposed thickness on its under sides to convey the impression of the substance and strength requisite to ordinary walling materials. This becomes difficult, if not impossible, where the shop front is continued upwards into the mezzanine, but can be obtained by recessing the window of the mezzanine upon the shop fascia.

The arched mezzanine treatment is most satisfactory, if not only so with any certainty, when several fronts can be treated alike, and a continuous effect, as of an arcade, obtained, the arches over each shop corresponding and providing the effect of mutual resistance to thrust which is required. In such cases there is no reason why the arched construction should not suffice for carrying the wall above, provided that the easement of support required from the neighbouring houses is secured by the mutual covenants which originate in a joint ownership of such rights. The north side of New Oxford-street, towards its western end, affords a successful and satisfactory example of this treatment, the general proportions of the whole block and the reduced window requirements of the upper stories being harmonised with large openings of the ground and mezzanine stories by the architectural treatment of the arcade. Though this example may be open to other criticisms as to internal arrangement, it presents a standard to which, unfortunately, there has been no approach in any more recent example of an extended façade of shop fronts. The architect should be urged to continue to make use of the story over the ground floor as a mezzanine on account of its value in extending the carrying proportions of the shop front, and of combining them with the complementary stories of the building into a homogenous and expressive design.

In general, architectural proportion is so much a matter of the relation of the solids to voids, that the designer of a shop-fronted house, limited as he is by earlier considerations, has very few principles left to guide him. The relationship of voids to solids cannot apply to this class of design, because the solids have to be eliminated as a condition precedent to suitability for shop display. The architecture becomes a collocation of window frames, and the solids of which these frames are apparently constructed are unreal, concessions to architectural fancy, as in most cases the stone piers and window heads are but casings to metal girders and stanchions, large and small alike. Deprived of grouping, confined in perspective, tied to a topsy-turveydom of design, the architect of a shop front has difficulties to contend with which one devoutly hopes that he is alive to. But it is to be feared, that the instructions of his commercial employer, that his new front must be exactly like a superior rival's, or must be like the Louvre in Paris, or, like a Scotch castle, have steeled his artistic soul, and he reflects that it is hopeless and profitless to struggle with a client who has no taste, and that after all he is not paid by him for any other purpose than to provide him with just what he knows he wants.

We have not mentioned other artistic terrors, as figure or name tablets, signs, and electric startlers, in many cases necessary to commercial existence, though rendered so only by the force of a bad habit, which could be readily and painlessly cured by statutory enactment. It may be suggested to the commercial world that the "best" shops, and streets of shops in London, are those where this obnoxious habit of self-assertive emptiness is less apparent than elsewhere, and that reputation and success are assumed by the public to belong to that house of business that dispenses with—to put it mildly—inartistic advertisement. However, as part of that frank modernism which we have predicated for the commercial architect, the provision of significant spaces for inscriptions, and of such signs, as architecture can, by deliberate forethought and pre-arrangement, make properly conspicuous and artistic at once, is a certain part of his problem, and a by no means unpleasant one. Inscriptions and signs add a literary value to buildings which grows in value with every year of their history, and we could foresee a pleasant development of particular symbols and types in commercial architecture expressive of and akin to purpose in the building of use alike to the tradesman and of interest to the public and artist.

The architectural qualities which can be exhibited in street architecture are thus comparatively limited. In the greater number of cases the front or façade only can be seen and is capable of considered design, though in corner buildings there is a return frontage available which admits of some grouping. The fronts of the many buildings forming a street are each comparatively narrow and lofty, and, unless the street is a wide one, the general effect of the design can only be appreciated from the limited standpoint of the pavement, either in sharp approaching perspective or in a directly opposite view from a point near to and under the building. These limitations very seriously affect the possibilities of successful results, it being borne in mind that the success of the architecture is that of the executed building *in situ*, and not of the harmony of the proportions in true elevation or upon its picturesqueness in an ideal perspective view. The test of satisfactory result rather than of pleasing elevation must be applied rigorously to his work by the architect. This is not an easy thing to do, as each projection and horizontal effect is accentuated, while vertical lines and proportions are all foreshortened from either of the possible perspectives of an ordinary street. London architecture has but few examples of suitable methods of dealing with this difficulty. The horizontal cornice upon the skyline and similar lines subdividing the front above and below each story of windows are the more usual methods. These have become simple to the designer solely from custom and from the facility with which they are drawn with a T-square, but a free consideration of the problem of designing narrow frontages to lofty buildings in a narrow street, would certainly suggest that horizontal lines, with no continuity beyond the limits of a small site are, possibly, not the only means with which to attempt suitable design. The varying contours of streets, sometimes broken, curved, and crooked, sometimes in long straight lines, would direct some treatment which would not necessarily—as continuous horizontal lines must—throw each separate frontage into violent contact with the proportions of its neighbour.

There grew up in Gothic times, in the narrow, devious lanes of busy mediæval towns, a method quite as universal as the use of horizontal cornices and lines, in the use of vertical ones, the grouping and arrangement being upwards, each window in a story being grouped over the one below it, the margin lines being made continuous, and carried up into a gable in which the centre one often reached to the top, creating stories in the roof as it went up. The principle seems more natural and proper, and one can easily imagine its growth among the craftsmen as a necessary tradition of street building, and vindicating itself by its suitability and truth of expression to their artistic instinct. It may be remarked that, in other branches of building, all of the same period, such as in the external design of churches, detached houses, and castles, there is no such universal tendency of vertical expression, the use of ornamental and corbelled parapets, tending to complete many aspects of these buildings horizontally. But in street architecture the vertical grouping is very general, and instances of any other principle would be difficult to find and group, until the dawn of the Renaissance, which brought with it the cult of the enormous horizontal crown or cornice.

Many examples remain in the low countries and in north and western Germany, as at Lübeck, Münster in Westphalia, and Nuremberg, of the assiduous application of the vertical principle to narrow street fronts, executed in brick and stone, and collectively a more instructive exhibition of the innumerable possible combinations of simple forms upon one method is obtained. Of similar wooden architecture, where the horizontal principle of beam or lintel construction necessarily enters all the construction and design, England furnishes examples in cities, such as Chester, Shrewsbury, and Tewkesbury, while in Normandy there are many refined examples of beautiful half-timber fronts. The application of a delicate artistic originality emphasising and giving value to vertical expression can be observed in mediæval examples, and the employment of horizontal steps in the brickwork gables, so characteristic to us of Bruges, is echoed in stonework examples in Westphalia, while the Scotch corbie-stanes or crows' feet all subserve the same vertical principle of design. The advent of the Renaissance in Northern Europe did not, as in the South, bring the pedantic use of huge shadow-casting cornices into its less sunny clime that was left for the pseudo Italian palaces which made the modern London of fifty years ago so gloomy, but allowed a great freedom of treatment in line and ornament, gradually casting loose from the craftsmen's methods of development from purpose, fitting and subduing all to preconceived notions of architectural effect. Swirling curves and disjointed architectural fixtures soon began to exercise themselves upon the polygon of wall surface provided by the front with its gable, and it was not until the need of a new restraint began to make itself felt that the freedom of rococo treatment was reduced by a steady application of horizontal cornice lines over and under each story of the façade.

The happy independence which was obtained by each front, when the vertical method of design was practically universal, procured in the aggregate of a street view a charming grouping and freedom which has a fascinating

effect, and always proves attractive to the artist follower of Prout and Roberts on his sketching tours. The more or less flexible curve of the lines of road and gutters in a winding narrow street combine and yet contrast with the closely grouped vertical subdivisions of the house fronts, often broken by occasional projecting oriels or corbelled turrets, or in half-timber work by joist ends and brackets, and with the gable peaks in varying proportions, heights, and skyline, pictures naturally form themselves without effort of fancy or composition. The charm of a mediæval town has certainly within it a basis of reasonable beauty instructive to us as modern street builders which will bear stripping of its antiquity and associations, that is of the quality with which we cannot endue our designs, and compare instructively with the artistic effect of more modern thoroughfares, whether purposely architectural—as in the chill sobriety of Moorgate or King William-streets—or accidentally arranged on modern lines—as in Queen Victoria-street or Shaftesbury-avenue.

We do wish to assure an universal artistic principle of street building design, for to do so would be to limit the illimitable possibilities of artistic combination and effect, but from the impressions of result we may derive safely enough the conclusion that in narrow frontages the design should be self-contained, its lines terminating satisfactorily within their own field, and the direction which is to the eye unbounded, namely, the vertical one, being that in which the artistic sense of appropriateness can be best brought to play. While totally, the effect of a street or city built of independent but self-contained designs, is pleasing, the separate fronts adding together picturesquely in the necessarily horizonal perspective of the streets.

There are, however, many principles of design and ideas of symmetrical or picturesque arrangement besides those into the discussion of which we have gone at some length.

The principal consideration, in contrast to what we will call the mediæval independence of each frontage, is that of an uniformity compulsorily applied either by that relic of mediævalism, most necessary and useful to architectural effect, the lord of the manor, or by special legislation. The underlying idea in such cases is the assumption, almost an unproved one, certainly uncertain, that uniformity of effect in street architecture is necessary and desirable in the interests of dignity and art. This whole doctrine of architectural symmetry has been courageously assailed by Gothic revival enthusiasts, its value denied, and its effects of repetition and gradation scouted, as formal weaknesses alien to the picturesque and truly artistic. The present generation stands in many respects at the parting of the ways. The heat of Gothic vigour has evaporated, and we are prepared to consider its artistic assertions at least as coolly as we have regarded the orders and proprieties of the preceding school which produced Regent-street and park.

Within the last half century public taste, national genius, or what you will to call that will o' the wisp, has romanticised into mediævalism with its guilds and crafts, ideally uniting work with art in life, and not in vain; also not in vain has it discovered the charms of the Bloomsbury and Soho view of art life, with its sober respectability of external appearance, and delicious completeness within, reticient to plainness about the house and home, and serenely Athenian in monumental churches and porticoed institutions. While this sprite of fashion is at present dissipating her enthusiasms in a somewhat libertine interlude, we can do no harm by putting in a plea for the organised hypocrisy of Regent-street, with its many and various dispositions and subdivisions successfully masked in stately groups and blocks culminating in the magnificent quadrant, new made annually with fresh paint which renews every architectural feature with whiteness of surface—and is not architecture mainly surface matter after all! The sense of scale, of grouping, of harmony, and of successful regulation, still survive in Regent-street, though well nigh three-quarters of a century have elapsed since it was designed, and of all London streets, it is yet the only one of which, as street architecture in total, we can in any way be proud. We must not fail, though, to qualify our self-congratulation by the objections which lie below the surface, for they will practically prevent an entire repetition of the experiment. The stately grouping of varying blocks has been achieved mainly by the sacrifice of what to-day would be altogether too valuable comfort in arrangement, and of market rental value in the "upper parts." There is a manifest wrestling between internal facts and external appearances, which struggles with windows, parapets, and roof lines. The pleasant proportion of width of street to height of building will be rarely attained now in any great city, and the charm of curved line on which the whole street scheme is planned from St. James's Park to Langham-place is uniquely happy in its architectural effect. The effort was a great one; the genius of Nash one for the occasion, and the result characteristic of the age that produced it, and serviceable and delightful to that which has followed. London would frankly approve of a repetition of the occasion, effort, and genius, and of a result as expressive of our generation as of that of the First Gentleman of Europe.

A practical aspect of our subject sorely presses us to-day in London, and to some extent in all our larger cities. We have been considering the improvement of our street architecture upon definitions of the requirements of commercial buildings, and the way in which the architect seriously devoted to the advancement of his art can meet and give them artistic expression. These requirements postulate as a requirer an intelligent progressive man of business as also a sympathetic and trained architectural mind to consider them. But practically neither the business man or the architect have anything to say upon the matter in a way which can affect street architecture, for their buildings are ready made for them. They are the production—and as such also express the characteristics and ideals of their producers—of building investors who, buying or securing the most prominent and serviceable sites, have erected speculative shops and warehouses upon them as ready-made goods for the purchaser. I do not propose to take any exception here to the speculative purchase of land likely to become valuable, or to its being offered at the highest obtainable figure, and though it is gravely open to doubt whether the policy of providing ready-made buildings is the best and most profitable either for the promoter or purchaser, or for both, I conceive it well to be within the proper limits of our subject to-night to protest in the name of our commercial men, in the name of architects, and of all passers-by who have regard for the pleasant, decent, and beautiful character of the cities of our land, against the outrageous vulgarity of design, ignorance, or defiance of elementary considerations of appropriateness, of proportion, and architectural suitability in expression, and against the abominably bad ornamentation that characterise the great speculative building blocks recently erected and now being carried out upon many of the most important sites in the metropolis. There seems to be no protection for the public, refined or unrefined, against the insults to taste and national self-respect by which the sordid incapacity of grossly ignorant men deface our finest and most important thoroughfares. The architecture of the whole class of speculative building is normally of a low class, but since this element has invaded the more expensive sites, and proceeded to erect buildings demanding the highest rents, the depths of the degradation of speculative building art have received new exploration and exposure that is appalling. Kind nature makes us slowly oblivious to constant or recurrent physical pain, but, speaking from painful experience, I cannot discover any such alleviation in the doom of having to come into daily contact with buildings in high places exhibiting the worst effects of architectural degradation. Indeed, a settled despair of London, in spite of much in many directions to give bright hopes of oases of cheer in the desert, drops with chilling and deadly effect upon that zeal without which an architect is fairly useless to his fellows and his art. A really bad building is a upas tree, to be destroyed as rapidly as possible; and of the real badness of this branch of modern street architecture no one has any doubt. It is not even to be expected that the promoter, or even architect (so-called) possibly knows, or cares, that it is bad or good. Their interests are otherwise entirely wrapt up in present profits, and these are compelled by the occupation by their buildings of certain positions, and ensured at no more or less, whether the architecture is a source of pleasure or pain to the citizens upon whom it is forced. We protest. If we can do nothing else, we will make this beginning by crying revolt against a shameless bad architecture, continued disgrace to our building art, commercial intelligence, national self-respect, and civilisation. There are no good points, not even of arrangement, and suitability or improvement, in the design of these blocks, and their construction sails as near inefficiency as the administration of a difficult statute by hard-worked and heavily handicapped district surveyors can allow.

In conclusion, it is not, perhaps, much good railing at a blot, however iniquitous, upon the surface of a city, but as the mischief is spreading rapidly, we would point out again that, while not limiting buying or selling, free trade if you will, in land of public or private importance, there is a definite call for such a censorship, as liberal as you like, but cultured and wide, that will prevent the intrusion of ready-made or purposeless buildings of hideous and incompetent architecture upon our public streets. With good will some reference to authority of designs in important streets of distinctive character should be readily obtained, not only as at present exists by statute upon construction, height, purpose, and accommodation, but upon the more widely-dispersed, though less concentrated evil, of bad design. There is as yet no sufficient standard of public taste to enable us to trust such censorship without fear of controversy in the hands of any mere officials, but with the organised societies for the promotion of the fine arts and architecture, and for the improvement of our cities, there should be no difficulty in obtaining sufficiently large committees of taste willing to proffer advice, criticism, and exercise veto without illiberality or narrowness. There may be danger in this suggestion, the censorship may prove either a stork or a log to the frogs, but there are greater dangers in the continuance of the existing state of things, for some of the best streets of London are already marred and appear to exhibit a gross decadence of public taste, which is really as untrue as any other artistic characteristic of such buildings.

The London County Council, happily, to some extent, seem alive to this danger in regard to the great thoroughfare which they have now in hand, and as they have proposed regulations for buildings upon the new crescent towards the Strand, and have held a tentative competition for uniform designs, that certainly marks a progression of ideas in the direction of proper control. But the subject is one of great difficulty and complexity; and unless the control is in the first place wisely directed in the true interests of successful architecture by highly competent hands, and in the second is so entirely firm by enactment and covenant that it cannot be broken away from, the experiment will not be successful. These two conditions are not unattainable, and Londoners hope for much, as they always do, in spite of much disappointment. Into the discussion of the great new street from Holborn to the Strand, so full of detail and interest, we cannot now enter if we would. The preliminary work is too far advanced for suggestions to be of much value to the authorities, but we can and do appeal to all who build in our streets, whether promoters, owners, men of commerce, of speculation, or of public purpose, to employers, builders, and architects alike, to consider how deeply important is the right use of every opportunity of permanent building to the whole city, and if character is written in stone, wood, or iron, that character should reveal devotion to the highest ideals.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting of the Royal Institute of British Architects was held on Monday evening at No. 9, Conduit-street, W., Mr. W. Emerson (President) in the chair.

The Royal Gold Medallist.

The Chairman said they would remember that the Council nominated Mr. Bentley for the Gold Medal, but unfortunately Mr. Bentley died two days before the election took place. They had to apply to the King, and ask what his pleasure was on the subject, expressing the wish that his Majesty should see fit that the medal should be given to Mr. Bentley's family. The King, as they knew, did not think it would be a good precedent to give the medal to the family because Mr. Bentley did not live to receive it, and the Council therefore could not do as they

wished. Consequently the matter of nominating some one else came before the Council that day, and he had the pleasure of telling them that the Council nominated Mr. T. E. Collcutt as the Gold Medallist for the year. It needed no words from him to tell them of the work Mr. Collcutt had done, or of his distinguished services in the interests of architecture, which had caused the Council to come to this unanimous decision. The election would come on in due course, when he had little doubt that they would duly give effect to the nomination of the Council.

Mr. Robert Langton Cole (London) and Mr. James Miller (Glasgow) were elected Fellows of the Institute, and the following gentlemen Associates:—Messrs. Alfred Ernest Biggs (Felixstowe), Walter Watkin Ellison (Erith), and T. Marshall Smith (London).

Inlay and Marquetry.

Mr. W. Aumonier then read the first of two papers devoted to the subject of "Inlay and Marquetry." Referring first to the beautiful specimens of work exhibited he said that most of them came from South Kensington, Mr. Purdon Clarke having placed practically the whole of the museum at his disposal. Mr. Clarke could not, however, lend anything out of the Jones collection as it would be against the terms of the will. He had, however, brought a drawing of one specimen in that collection which gave them the colouring of Louis XVI. work which he thought was very beautiful. Proceeding Mr. Aumonier referred first to the two methods of making inlaid wood. The one is to cut the design which is intended to be inlaid, and the ground or field, out of various sorts of veneers, all of the same thickness, fitting and fixing them together by thin paper on one face, and laying this, the open face downwards, as a whole upon a solid ground or board. This is veneered work. The other way is to cut the design out in separate pieces as above, but out of wood $\frac{3}{16}$ in. to $\frac{1}{4}$ in. thick, using the same process of marking out, and then putting the complete print of the design on to a solid ground or board, sinking holes by carvers' tools the required depth, and driving the pieces in, thus making a "solid inlay." In speaking of "marquetry" and "inlay," it was never quite understood which sort of work was indicated—whether the solid inlay or the wholly veneered work. As the workmanship of each was so distinct, he would use the term "marquetry" for veneered work, and "inlay" for the solid inlay above described. The author then dealt with the technical side of the question, describing the old-fashioned process, and that now generally employed, of marking and cutting the design in the wood, shading, &c. In his opinion, strong contrasts or too many different colours on the same panel should be avoided, except, perhaps, in the case of ivory in ebony, or mother-of-pearl in rosewood. One should depend rather upon soft harmonies, such as are seen in the best examples of Louis XVI. work, with their warm soft greys and yellows, or in the golden glow of the magnificent inlay in Pisa Cathedral. A broad effect should be striven for, to be produced by the quality and colour of the wood itself and by the direction of grain in which each piece is placed. On no account should scratching or engraving be used on the surface of the inlay, least of all to express roundness or relief in form. Dealing with a flat surface, an absolutely flat treatment should be followed. One should not aim at too great fineness, or intricacies and complications of lines in the design. It is useless to try to emulate the painter and attempt to make too much of a picture—the material is against it.

The author went on to speak of the difference between the quality of marquetry and inlay, taking the words to bear the meaning above attached to them. "Marquetry," being wholly the work of the saw, is apt to become a little too soft and undulating, and perhaps a little bit flabby in parts, under the influence of that more or less mechanical instrument; while "inlay," being partly the saw's work, and, in part, the work of carvers' tools—cutting in and working by hand—is capable of receiving a stronger, more vigorous treatment of outline, and is therefore likely to reach an individual and lifelike character of form unattained by the saw alone, which stamps it as finer work—from an art point of view; and even the occasional inaccuracies of fitting, and consequent different thicknesses of joints here and there, give it a distinct charm of its own. It also has a more pleasing quality of surface, especially as, in course of time, the inlay, being thinner, shrinks more than the solid ground, and thus becomes a little lower than the general surface, making a delightful play on the face of the work.

Solid inlay, with the inlay left in relief and afterwards carved, the author strongly condemned. Carving—as carving—is not improved by having its ground made of a different colour from itself. Inlay—as inlay—is not helped by having its surface frittered away by the undulations of carving. In conclusion, he urged them to sweep away all scratchy, uncharacteristic work, and get back to the face of Nature for inspiration in this as in other arts.

A paper by Mr. Heywood Sumner dealt with the simplest form of inlay in wood, namely, coloured wax stoppings, a form of inlay which has fallen into neglect. The Victoria and Albert Museum has some very fine specimens of old work of this kind. The effect is produced by incised lines, sunk spaces, and dots, all filled in flush with green and red wax. Though, after the lapse of 550 years, some of the stopping has perished, yet the beauty of design yielded by the firm incisions remains, and these old examples show what fine things can be done in this method by artists who understand the graphic possibilities and the limitations of flat surface decoration. Mr. Sumner went on to describe the method he had employed in some experiments of his own in this kind of work. First trace the design on the panel of wood to be incised; cut it, either with a V tool or knife-blade fixed in a tool-handle; clear out the larger spaces with a small gouge, leaving tool-mark roughness in the bottoms for key; when cut, stop the suction of the wood by several coats of white hard polish. For coloured stoppings, resin (as white as can be got), beeswax, and powder distemper are the three things needful. The melted wax may be run into the incisions by means of a small funnel with handle and gas-jet affixed; it is attachable to the nearest gas burner by india-rubber tubing, so that a regulated heat can be applied to the funnel. When thus attached and heated, pieces of wax of the required inlay colour are dropped into the funnel, and soon there will be a run of melted wax dropping from the end of the funnel-spout, which is easily guided by means of the wooden handle, and thus the entire panel may be inlaid with the melted wax. Superfluous surface wax is cleared off with a broad chisel so as to make the whole surface flush. The suction of the wood is stopped by means of white hard polish, otherwise the hot wax will enter the grain of the wood and stain it. Incised panels may be filled successfully with japanners' gold size and powdered distemper colour, using a palette knife to distribute the slab mixture. The melted wax, however, gives a more interesting and accidental result, and is better suited for designs that depend on spaces of colour-stopping for their effect. A close grain is the one thing needful in the wood. As to design, that which is best suited may be compared to a broad sort of engraving. Within certain limits, the manner of design is more free than is the case with inlay composed of veneers of hard material. The absence of beauty of material—*e.g.*, pearl, ivory, or choice woods—must be forgotten in the beauty, fancy, and austere freedom with which the incised decoration is expressed.

Replying to a question, Mr. Aumonier said that all the specimens shown in the room were labelled. Referring to one specimen, he pointed out that although two panels in it looked entirely different, because in one case the colour of the ground was light and in the other case dark, the prevalent idea was that the design was cut out of two veneers and dropped in, but that was not correct. Every part of the marquetry veneer was cut separately. They could not cut through the veneers, as they would waste a lot of their pattern by the thickness of the saws, although it appeared to be done so.

Mr. Crace said he thought Mr. Aumonier was mistaken, as he had seen it done in his own workshops.

Mr. Aumonier said that was not usual in the best work. Mr. Crace might do so, but it was only a primitive way of doing work. He knew what the work was. Elizabethan work was very beautiful, but it was very crude, and Mr. Crace would see nothing like what he spoke of in Louis XVI. work—it was not possible to find it.

Mr. J. D. Crace, in moving a vote of thanks to the readers of both papers, said that although he for the moment differed from Mr. Aumonier on a particular point, yet he had listened with great interest to the paper. It was particularly interesting to him, because one of the first times he came into those rooms was exactly forty-five years ago, when his father read a paper on the same subject and brought a professional marquetry cutter, who in the room cut specimens for those present to see the process of cutting. Amongst other points, he illustrated the fact that two panels were constantly made with reverse colourings by cutting through the ground and pattern by the one process. He might say with regard to that that the famous artists in marquetry, Boule, who did so much work of the best kind in France under Louis XIV., cut their work in that way, and it was a common thing to produce two pieces of furniture in which one was with brass inlaid on the black and the other the pattern of the work inlaid on the brass, so that it was very obviously utilising what otherwise would have been very costly waste of material. There was another point in the process which he did not think Mr. Aumonier touched upon. Instead of pouncing the pattern on paper, the finer French work was done by engraving the pattern on a metal plate and then transferring to paper. That, of course, was only worth doing when the work was to be produced more than once, but it gave a finer line than dotting. With regard to Elizabethan work, a great deal existed in this country in various forms, and much of it was very rough, although there were some fine pieces. He would mention particularly a number in Hardwicke Hall, where a great deal of old furniture remained undisturbed, and anyone visiting Hardwicke Hall could not fail to look on the interesting examples of English inlay work. Of course, some of the finest Italian work was to be found spread all over Italy, and beautiful pieces were to be found in almost all the important towns. Some of the very finest, however, was to be found at Bergamo. Although half inclined to agree with Mr. Aumonier about not combining carving with inlay, still, it was very difficult to stand opposite the cathedral stalls of Bergamo and repeat that, because there was some of the most beautiful work in the pilasters of those stalls that could possibly be executed—extremely delicate, and undoubtedly the effect was extremely refined and beautiful. He agreed all the same that it was not an art to encourage, but still a very beautiful example was to be found where he had mentioned. A very well known example was the marvellous cabinet made by Fourdinois in the Kensington Museum—a piece done for the Paris Exhibition of 1855. Then Mr. Heywood Sumner had mentioned wax inlay, which reminded him that in Italian work there was another form of the same method, only instead of wax they used whiting and glue. In the furniture room of Kensington there were many chests and other pieces done in that way. The ground, having had incisions made in it, these were filled in with whiting and glue and linseed oil. Of course, one of the most beautiful forms of inlay which the Italians executed was with ivory on walnut-wood or black wood. One ought not quite to taboo engraving on the surface, as sometimes it was almost necessary for explanation. In doing figures, for instance, if they wanted to indicate such features as the eyes, it could hardly be done by the saw for they came into the middle of the space—they would have the process of getting the saw through to begin with. Still, he admitted that the engraver should have a very subordinate part. As regarded the tinting, no doubt stained wood was largely used by the Italians and French. A great many of the pieces so charmingly tinted and coloured were very much brighter when made, and, undoubtedly, stained wood was used, and he saw no great reason against it. Still, the more nearly the work could be confined to the natural products undoubtedly it was more harmonious, and, as a rule, the more beautiful would the result be.

Mr. Butler Wilson said he had great pleasure in seconding the resolution, for he had listened to the two papers with great interest, having for a long time taken a great interest in furniture, and more recently in inlay. It seemed to him that probably the earliest examples of inlay were to be found in the Venetian work of the fourteenth century, when wood was inlaid on ivory boxes. It had struck him that inlay was practically mosaic in wood, but it was

something more, and this desire to differentiate in different colours in the form of inlay had taken many curious forms. In the eighteenth century they would find, both in Dutch and English work, coloured straw work which was very remarkable, and gave a wonderful appearance of careful inlay. They also found in the sixteenth century inlays of coloured marbles. There was one particularly fine example at Kensington of various coloured marbles inlaid in white marble, which he went to see that morning. It was 3 ft. 6 in. by 9 in., and many scores of pieces of marble were inlaid. Then they came to the great veneerers —Boule work—and at the Kensington Museum they would find one commode, early eighteenth century, late Louis XIV., of tortoise-shell, mother-of-pearl, coloured ivories inlaid with brass. It was near the entrance to the Art Library, and was most elaborate in design, and it seemed to him that the whole thing was carried too far. They had again at Kensington a console table of Louis XIV. of engraved brass inlaid in tortoiseshell, the design being a triumphal car and attendants. But it seemed to him that in many of these cases there was a misuse and a misapplication of materials, and he was reminded of visiting the Island of Murano, where he saw some good modern glass, but was also offered glass watch-chains and slippers. He was rather drawn to the English oak panelling of the sixteenth century, such as that in the Sizergh room from Sizergh Castle at Kensington, and that for which they paid 1,000*l.* he thought was worth a great deal more. That was inlaid with holly and bog oak, and it seemed to him to be very simple and agreeable to the comparatively rude style which was adopted in that room. Other work in Italy which struck him as being simple and harmonious in its character was that at S. Miniato, at Monti, and Santá Croce at Florence. That, he thought, was simple and reasonable for one wood to be inserted into another, but directly the inlay became elaborate, as in the pieces he saw at Kensington, he thought there was a misuse. There was one most remarkable piece of furniture at Kensington. The brass background was reduced to a minimum with veneers, mother-o'-pearl, and tortoiseshell. The whole thing dazzled, and he could imagine a rich French room receiving that piece of furniture. It was like an exceedingly well-dressed woman carrying many gems, being the gem in a magnificent salon, yet who would probably be out of place in a simple English oak room. Thus, it seemed to him that the general needs of English domestic work were best met by the simple examples, such as those found in the Sizergh room.

Mr. W. G. Wilson said that in cutting one piece out of another the piece cut out would necessarily be smaller than the hole, to the extent of the thickness of the sawcut, so that were the cut-out portion used in forming the inlay of second panel the pattern would be smaller.

Mr. Aumonier said it was never done.

Mr. W. G. Wilson: I am supporting your contention, Mr. Aumonier; as the patterns in the two panels under discussion are of equal size, the last speaker is obviously mistaken.

Mr. Aumonier replied that it certainly would be. He would like to ask Mr. Crace one thing: Mr. Crace had spoken about engraving the pattern, and he would like to ask him if he could show an engraved pattern which would give a finer outline than the one he had at the moment in his hand, and that was done by pouncing?

Mr. Crace said he was not dealing with excellence. As a matter of fact, the French engraver did engrave, and printed from the plate.

Mr. Aumonier said he was speaking of English. Nearly all the marquetry cutters in London were Frenchmen, and they did it with pouncing, and he did not think it could be done better by engraving. They might do so in Paris, but it was not the usual way. With regard to Mr. Crace's excuse for engraving in the case of eyes, anything worth doing could be equally well done by the saw, and he would allow no excuse whatever for engraving, and would not himself have a single line engraved. They had to make the wood speak for itself, and put the grain in such a way as to give the feeling of the object they had to represent, and they did not want engraved lines on that. If they did want them, so much the worse for them, for they ought not to want them. They had to show what they wanted to show with the wood itself.

The Chairman said he was sure they would all join in the hearty vote of thanks to the readers of the papers. He had been rather surprised that neither of the gentlemen had mentioned the celebrated inlay work of the East in Egypt and India, which, perhaps, went further and was more elaborate than any of the Western. Mr. Butler Wilson had mentioned the marble inlays, but that hardly came under their purview that night, but at Agra he remembered a number of roses on tombs, and in the little roses which could be covered by a shilling there were thirty-two pieces of agate in each rose. It was marvellous, but it hardly came within the discussion that night. So far as he had seen that inlay work in Italy and France, Egypt and India, the Oriental inlays, although not so elaborate in fanciful designs, in regard to geometrical design and the elaboration of geometrical designs had never been approached by the Westerns. He was much interested when with Mr. Burges in the inlays he did for Worcester Chapel, Oxford. They were some of the nicest specimens of modern inlay work he had ever seen.

The vote of thanks was then carried unanimously, and a vote of thanks was also passed to Mr. Purdon Clarke and to the authorities of South Kensington Museum.

The Chairman said he had to announce that the next meeting would be held on Monday, April 21, when Mr. Alex. N. Paterson would read a paper on "Tradition in Architecture; its Function and Value."

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE Association of Municipal and County Engineers held a Midland Counties district meeting at Birmingham on Saturday last, when there was a numerous attendance of Midland members. The business meeting was held in the Council Chamber at the Council House, the use of which was granted by the Lord Mayor of Birmingham. Mr. E. G. Mawbey, C.E., of Leicester, presided, and among those present were Mr. J. Price, Birmingham; J. T. Eayrs, Birmingham; A. W. Greatorex, West Bromwich; C. F. Wike, Sheffield; R. J. Thomas, Aylesbury; E. J. Silcock, Leeds; J. Parker, Hereford; J. S. Pickering, Nuneaton; J. Lobley, Hanley; H. Price, Birmingham; J. Wilcox, Birmingham; Kidd, Swadlincote; and others.

The Deputy Lord Mayor (Alderman S. Edwards) said that on behalf of the Lord Mayor, whose illness they all deplored, he wished to extend to the Association a hearty welcome on their fourth visit to Birmingham. One of the principal objects of the Association was to apply the science of engineering to towns and rural districts, than which nothing could be more benificent and important.

The Chairman, in moving a vote of thanks, said the meeting that day was a new feature of the work of the Association, being a winter meeting for the discussion of papers. He looked forward to these meetings being very useful from an educational point of view.

Mr. J. Price, Birmingham, then made an appeal to the members for further support to the benevolent fund of the Association. The accounts for last year showed donations of 55*l.* 14s., and annual subscriptions of 124*l.* 1s. He thought the Association, with a membership of over 1,000, could do better than that.

Filtration of River Water.

Mr. A. J. Jenkins, Asso.M.Inst.C.E., read a paper on "The Filtration of River Water." He said as our large industrial centres were filling up the pressing demands for increased supplies had to be met, and as it was not practicable for every place to appropriate a lake in Cumberland or a valley in Wales consideration had to be given to the utilisation of the less pure streams and rivers, and to the means available for restoring them to something like the purity of their upper reaches. The question then arose as to whether rivers which were liable to pollution could be regarded as possible sources of water supply, and, if so, what means were necessary to prevent such a supply becoming dangerous to the health of the community. He would presume that a river liable to serious pollution had to be purified in the highest degree for domestic consumption, and that reasonable cost was permissible, and that the best of materials were available. In the treatment of river water there were three methods:—1. Sedimentation in storage reservoirs; 2. Slow filtration through sand, to which they were most familiar in England; 3. Coagulation by the addition of chemicals, and the subsequent rapid filtration, which was largely adopted in the United States. The advantages of sedimentation could not be too highly advocated. A few days' rest would effect the clarification of river waters containing all but the finest particles, and the deposit of mineral matter in suspension was accompanied by a very great reduction of the bacteria present. Apart from the reduction of the number of bacteria by what they might term precipitation, due to the mechanical sedimentation of the mineral matter, there was no doubt a great reduction in the number and vitality of the harmful bacteria by the bactericidal action of the harmless species working with the assistance of sunlight and air, and it might safely be assumed that the longer the period allowed for sedimentation the greater the degree of purity that would result. Filtration was merely the straining of water through fine insoluble media, and nothing was, of course, more suitable than clean fine sand. As the result of careful observation, it had been found that if a high degree of bacterial efficiency was to be maintained, the rate of filtration must not exceed four lineal inches per hour. This was practically two gallons per square foot per hour, or rather more than 1,000,000 gallons per acre per twenty-four hours. It was highly essential that this rate of filtration be regular, and controlled in such a manner that it could not possibly be exceeded, or the effect would be to wash the bacteria previously caught on the upper layers of the sand into the coarser materials below, or through the filter altogether. As filtering medium he suggested 3 ft. of fine sand, and below it 18 in. of fine to coarse gravel. The floor of the filter should slope quickly to the central drain, as a free outlet for all parts of the beds was of the highest importance to promote equal filtration throughout its full area. The drains should be in such a form that the filtered water was collected thoroughly and evenly, and so that when charging the filter from below the water was distributed without risk of disturbing the sand. It was of importance that the sand grains should be uniform in size and as fine as could be obtained. He had used sand so fine that over 60 per cent. of the particles would pass through a sieve of 4 900 meshes to the square inch, and the filters were giving excellent results. It was considered necessary to put under this fine sand a 6-in. layer of rather coarser sand to prevent it being washed away. The chief points to be regarded in the design of the inlet chamber were (1) regulation of the rate of inflow so as to maintain a constant top-water level; (2) arrangement so that the inflow of water should not unduly disturb the sand around it. To meet the former requirement a good automatic valve was necessary, and for the latter it was well to make the inlet basin fairly large, direct the inflow downwards so that it might eventually flow upwards and out of the basin with decreased velocity. It was also well to keep the wall of the inlet chamber above the sand level. The average cost of a large number of works, scattered over the whole of Northern Europe, had been about 10,000*l.* for uncovered and 15,000*l.* for covered filters, and at this figure first-class work could be carried out in England at the present time. In the United States the average cost had been 30,000 dols. per acre for uncovered filters and about half more for covered. The average cost of working the filters of the seven London Water Companies had been stated by Mr. W. B. Bryan, of the East London Water Company, to be slightly over 4s. per million gallons, the minimum being 3s. for the Chelsea Company, and the maximum 4s. 9d. for the Grand Junction and West Middlesex Companies. An attempt to pass turbid waters through sand filters without some preliminary treatment resulted in the very rapid clogging of the filter, or if the silt be a very fine one turbidity would still remain. The coagulent in most general use was alum. Lime might with advantage be used in certain cases where it also served a second purpose in the softening process sometimes required. Mechanical filters had been very extensively used in the United States, the reasons for adoption being small first cost, efficiency in dealing with

muddy waters. The causes which had probably prevented their general adoption in England were heavy working cost, the success of the older methods, and our insular prejudice to innovations. Comparing the two systems, and considering working cost against first cost, there was practically no difference between the two. Summing up, Mr. Jenkins said purification of polluted water was accomplished in four ways, viz., by (1) dilution, (2) time, (3) sedimentation, (4) filtration. When the first two failed, or were not available, the third might be employed, but the general and safest method known was filtration.

Mr. E. J. Silcock, Leeds, said with respect to the sand used in the filters, he was disposed to think Mr. Jenkins was asking for too great a fineness when he spoke of 60 per cent. of the particles passing through a sieve of 4,900 meshes to the square inch. What was more to be aimed at was the degree of uniformity than of fineness. He thought 3 ft. should be the maximum depth; the principal thing was to have good sand, and not filter at too great a speed. Beyond 2 ft. of sand, the remaining part was of very little service, and merely formed a support for the surface doing the work. With respect to water obtained from gathering grounds, especially in Yorkshire, discoloration from peat was very marked in some cases, and very difficult to get rid of. They could not filter it out, and the great part of it must be taken away by sedimentation in the reservoir.

Mr. J. Parker, Hereford, said that at Hereford they were much limited for storage capacity and area for filtration, and therefore had recourse to mechanical filters. They had, however, some difficulty in getting the Local Government Board to sanction a loan for those filters.

Mr. Caink, Worcester, said experience had shown that water subjected to sand filtration gave the best health statistics. A number of towns supplied with water from the new red sandstone, which had the reputation of being of the highest quality chemically and bacteriologically, had a typhoid case rate ranging from 150 to 200 per 100,000 of population per annum, while towns supplied with river water, which received sewage pollution, when efficiently filtered in an adequate filtering area, even without sedimentation, had typhoid case rates ranging only from 20 to 50 per 100,000 of population.

Mr. J. S. Pickering, Nuneaton, said he had a very exhaustive report made upon the Washington Waterworks. After experimenting upon a very turbid water for nine months continuously with a mechanical filter and the English filter, they came to the conclusion that the mechanical filter gave the best all-round results, both as to getting a brighter water and also removing more bacteria. It seemed to be said by the bulk of American engineers that it was impossible to purify a turbid water through sand.

Mr. Watson, Birmingham, said he could not agree with the criticisms which had been made as to the depth of sand. He thought the proportions given were well suited to the kind of water dealt with.

Mr. J. Price, Birmingham, said in the filtration of water containing clay, it was a question of specific gravity.

Mr. Jenkins, in reply, said the depth of sand recorded in the filters was from a highly-polluted water supply.

Building By-laws.

Mr. F. C. Cook, Surveyor to the Urban District Council, Hinckley, read a paper on the position of local authorities in regard to building by-laws. There was, he said, no doubt as to the necessity of some such series as a guide to local authorities, and although criticism had been rife as to the wisdom or unwisdom of particular clauses, yet bearing in mind the difficulty of drafting by-laws of practical value, unassailable from a legal standpoint, one could not but admit that the authors of the model code had acquitted themselves well of their task. The objection was not so much to the model series in themselves as to the hard-and-fast rules which seemed to govern the officials at the Local Government Board in dealing with suggested deviations therefrom on the part of Local Authorities; consequently they had come to be looked upon not as intended for the guidance of Sanitary Authorities in framing by-laws, but rather as the laws of the Medes and Persians which altereth not. Those who had had the unhappy task of submitting proposed by-laws for the consideration of the Local Government Board could fully appreciate the hopelessness of attempting to obtain the official sanction to anything more than practically a mere verbal alteration of the model code. There appeared to be three main lines upon which any suggested measure of reform should run—(*a*) a levelling up, so to speak, by the compulsory adoption of modern by-laws in districts which were at present behind the times in this respect; (*b*) the formulation of a code of model by-laws confined to those points which experience had shown to be essential; (*c*) the empowering of local authorities to make supplementary by-laws and regulations specifying what might be regarded as matters of detail, and containing provisions specially suitable for the needs of different localities. There was evidence on all hands of dissatisfaction at the existing system, and he hoped that representations from the Council of the Association, as embodying the views of those who by every-day experience were brought into close contact with every aspect of the question, would have some effect with the Local Government Board.

Mr. J. Price, Birmingham, considered the chief fault was the want of elasticity on the part of the Local Government Board in dealing with by-laws.

Mr. Greatorex, West Bromwich, mentioned that two years ago a meeting of all the Midland surveyors was called by Mr. Price at which they discussed the model by-laws. He thought it would be a good thing if the surveyors in each district into which the Association was divided held such a meeting, and after drafting by-laws sent them to the Council of the Association to be amalgamated into a whole and submitted to the Local Government Board as a model set.

Mr. Lobley, Hanley, congratulated the author upon the moderation of his paper, as it was very difficult indeed to speak with moderation of the peculiar position of the Local Government Board.

Mr. E. Price, building surveyor, Birmingham, mentioned that the Royal Institute of British Architects had been interesting themselves in this question for some time, particularly with regard to the by-laws for rural districts, and there was no doubt they had got certain concessions in the last model by-laws by the Local Government Board for rural districts.

Mr. Lacey, Oswestry, considered that the paper did not leave much room for criticism, further than to air their grievances against the Local Government Board.

The Chairman said they had had great difficulties at Leicester, and the conclusion they came to was to stick to their old bye-laws which gave them greater powers than the new bye-laws, and to obtain further powers required in the omnibus bills.

Mr. J. S. Pickering, Nuneaton, moved that the Council of the Association be requested to take into consideration the existing unsatisfactory condition with respect to the making and administration of by-laws relating to new streets and buildings with a view to representation being made to the Local Government Board thereon.

Mr. J. Price, Birmingham, seconded, and it was carried unanimously.

Illustrations.

THE VICTOR HUGO MONUMENT, PARIS.

WE give two views of this monument, recently erected in Paris near the house formerly occupied by Victor Hugo.

The monument, and the figures and subjects included in it, were fully described in the Letter from Paris in our issue of March 1. We need only remind the reader here, that M. Barrias is the sculptor to whom the whole design is owing; M. Allar having been responsible for two out of the four bas-reliefs with which the pedestal is decorated. The two which appear in these illustrations are those by M. Barrias.

SKETCHES AT VENICE AND CAUDEBEC.

THE two sketches by Mr. C. Wontner Smith, published in this issue, are from the set for which the Pugin Travelling Studentship was awarded. One of them shows an angle of the ducal palace from a different point from that of most illustrations. The other is a late Gothic doorhead, with a grotesque human face carved in it, at the church of Caudebec-en-Caux, Normandy.

DESIGN FOR A ROOF TO A PICTURE GALLERY.

THIS is the design which obtained for its author, Mr. Lionel U. Grace, the Grissell medal of the Institute of Architects this year. The Grissell medal was founded as an annual prize for the best design for some problem in practical construction, the subject to be set by the Council of the Institute. It is a very useful prize, as stimulating that study of practical construction which is unfortunately so much neglected among the younger generation of English architects; it is to be regretted that the competition for it is generally but small in comparison with that for the prizes given for artistic design, though in the present year there was a rather better contest than usual.

The following is the author's explanation of his design:—

"After a careful study of the various picture galleries in London I came to the conclusion that this was the most satisfactory form of roof as regards the proportion of light obtained, and by far the best method of lighting a picture gallery 60 ft. by 30 ft., as required by the conditions of this competition.

The roof is constructed with steel trusses at 12 ft. centres, sufficiently indicated to enable an engineer to carry out the design with economy. These support the R. S. purlins which carry the continuous skylight, and coke breeze concrete filling with necessary intermediate joists, &c.; a ventilating duct is formed at the apex, with electric fans at the gable ends.

The internal decoration is intended to be in fibrous plaster secured to the coke breeze, but wood panelling would be employed where obviously necessary.

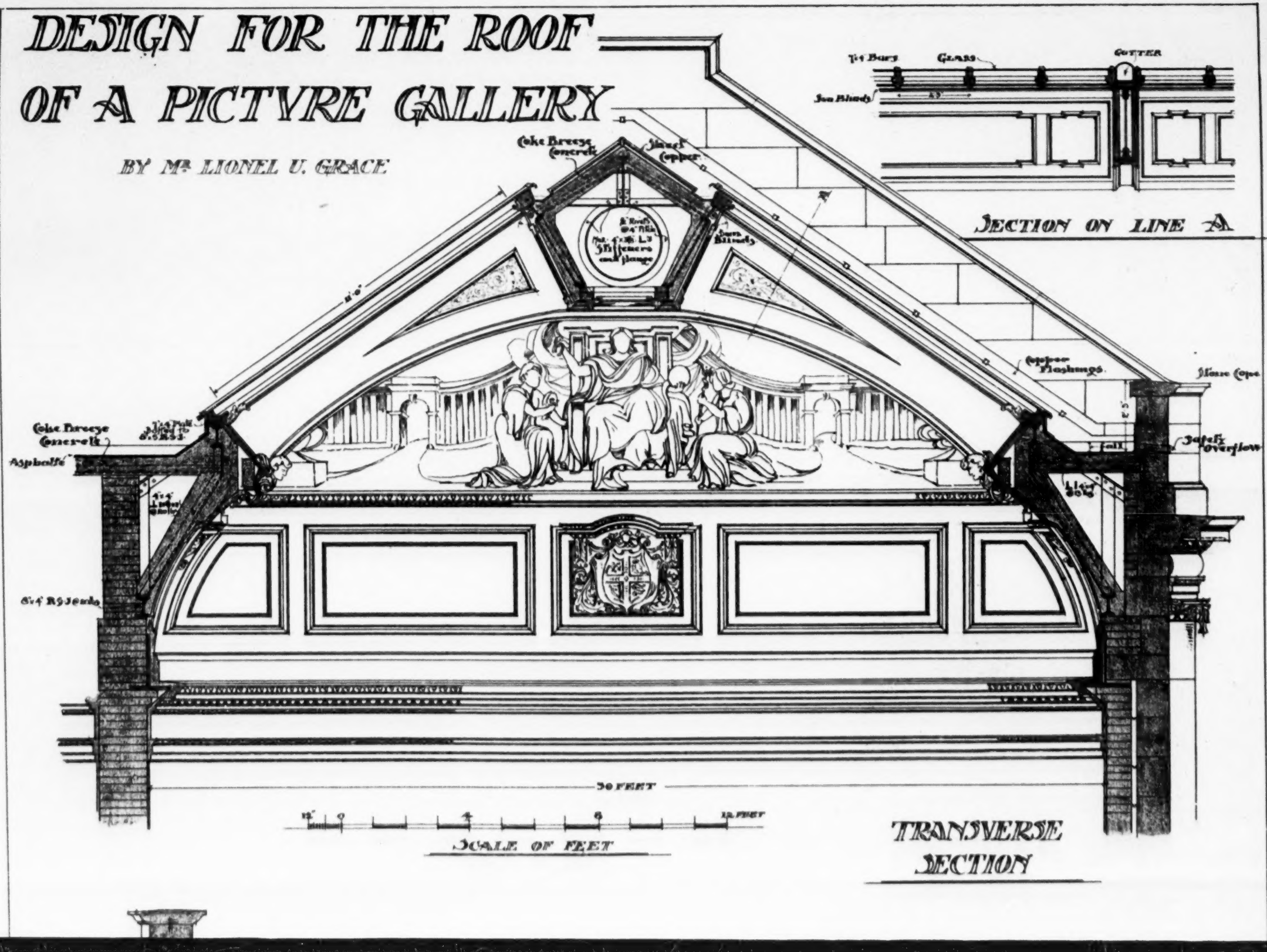
The allegorical decoration in the gable ends, together with the carving in the panels, would be about 4 in. in relief, although in practice, under the circumstances, one would be rather chary about using decoration of this description."

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held on the 2nd inst., in the rooms, 117, George-street, Mr. Henry F. Kerr, the President, in the chair. Mr. James Bruce, W.S., submitted the following motion: "That it be remitted to the Committee of Management to consider the provision made in the Scottish Universities for the teaching of architecture, and in the event of the Committee being satisfied that the same is inadequate, to report whether in the opinion of the Committee an application should be made to the Trustees of the Carnegie Trust, with a view to more adequate provision being made for such teaching." Mr. Bruce remarked that in the University of Edinburgh there were fifty-two Professorships, but among them all there was not one devoted to architecture. In the Faculty of Law there were no fewer than seven Professorships. When they thought of the enormous importance of architecture to the health, happiness, and comfort of the people, it was really a very extraordinary thing that in the University of Edinburgh there was no such thing as a Professorship of Architecture. More than that, so far as he knew, in no Scottish University was there any provision made for a Professorship of Architecture. The Carnegie Trust had just been considering the wants of the Scottish Universities. The Universities had been asked to indicate where their wants lay, and although he had gone over the statements published on behalf of the University authorities, in not one of them was there even a hint that there was any lack in the matter of the teaching of architecture. Surely that was a strange position for the Universities of Scotland to occupy. Accordingly he thought it would be well for a body such as the Edinburgh Architectural Association to directly press upon the Carnegie Trustees the advisability of something further being done in the matter of the teaching of architecture in the Universities. He used the

DESIGN FOR THE ROOF OF A PICTVRE GALLERY

BY Mr LIONEL U. GRACE

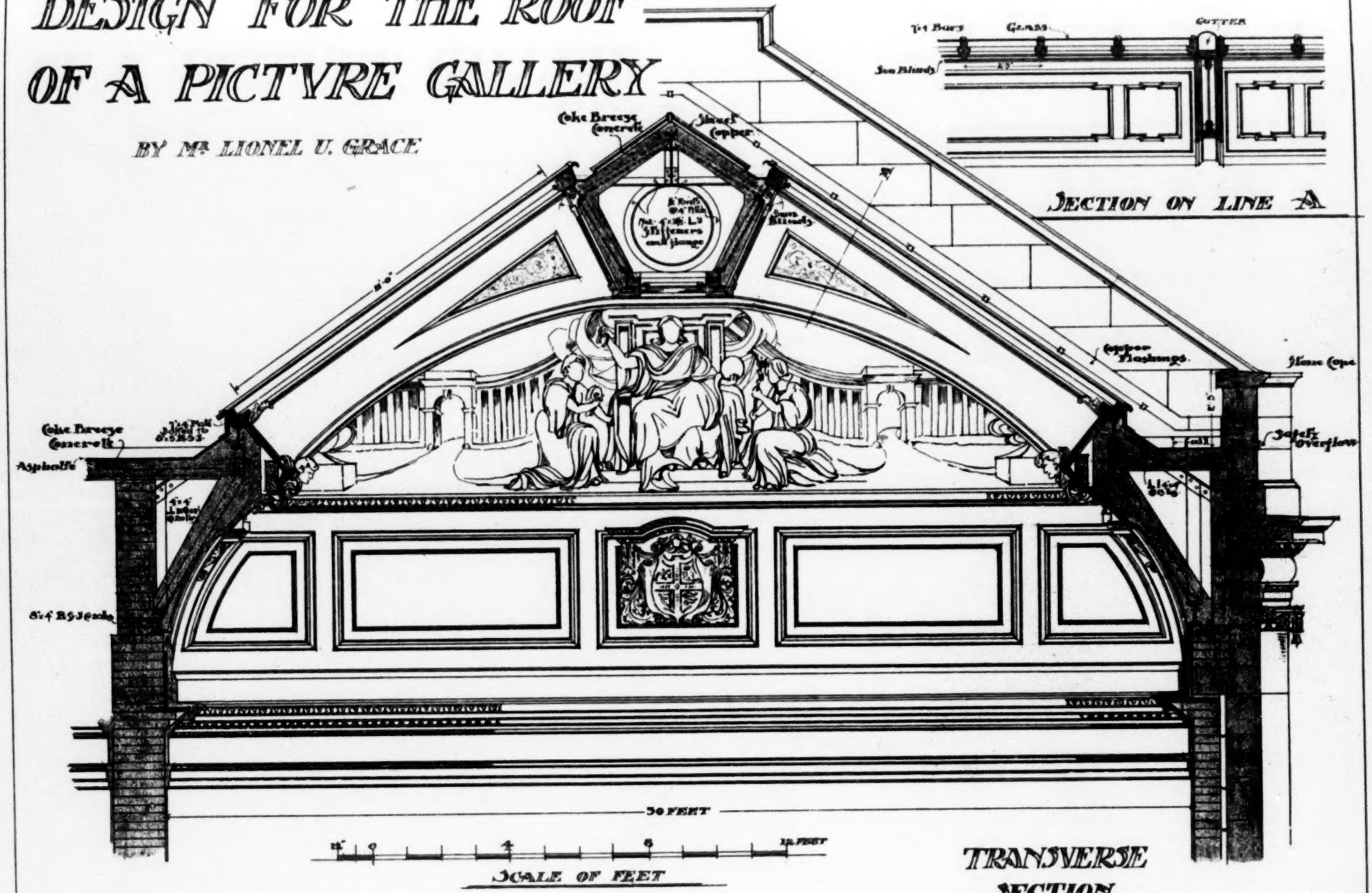


TRANSVERSE SECTION

SECTION ON LINE A

DESIGN FOR THE ROOF OF A PICTVRE GALLERY

BY Mr LIONEL U. GRACE



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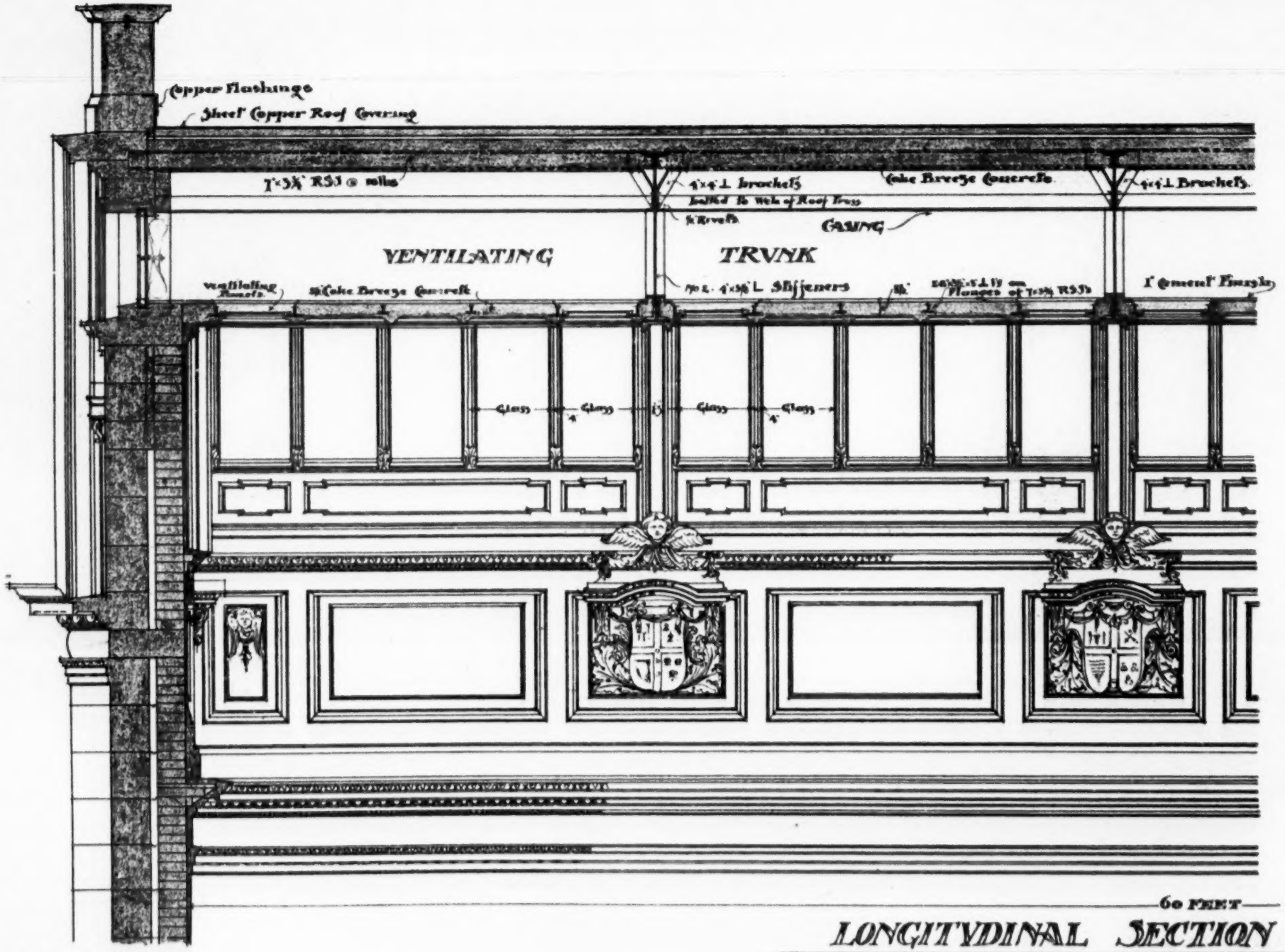


60 FEET

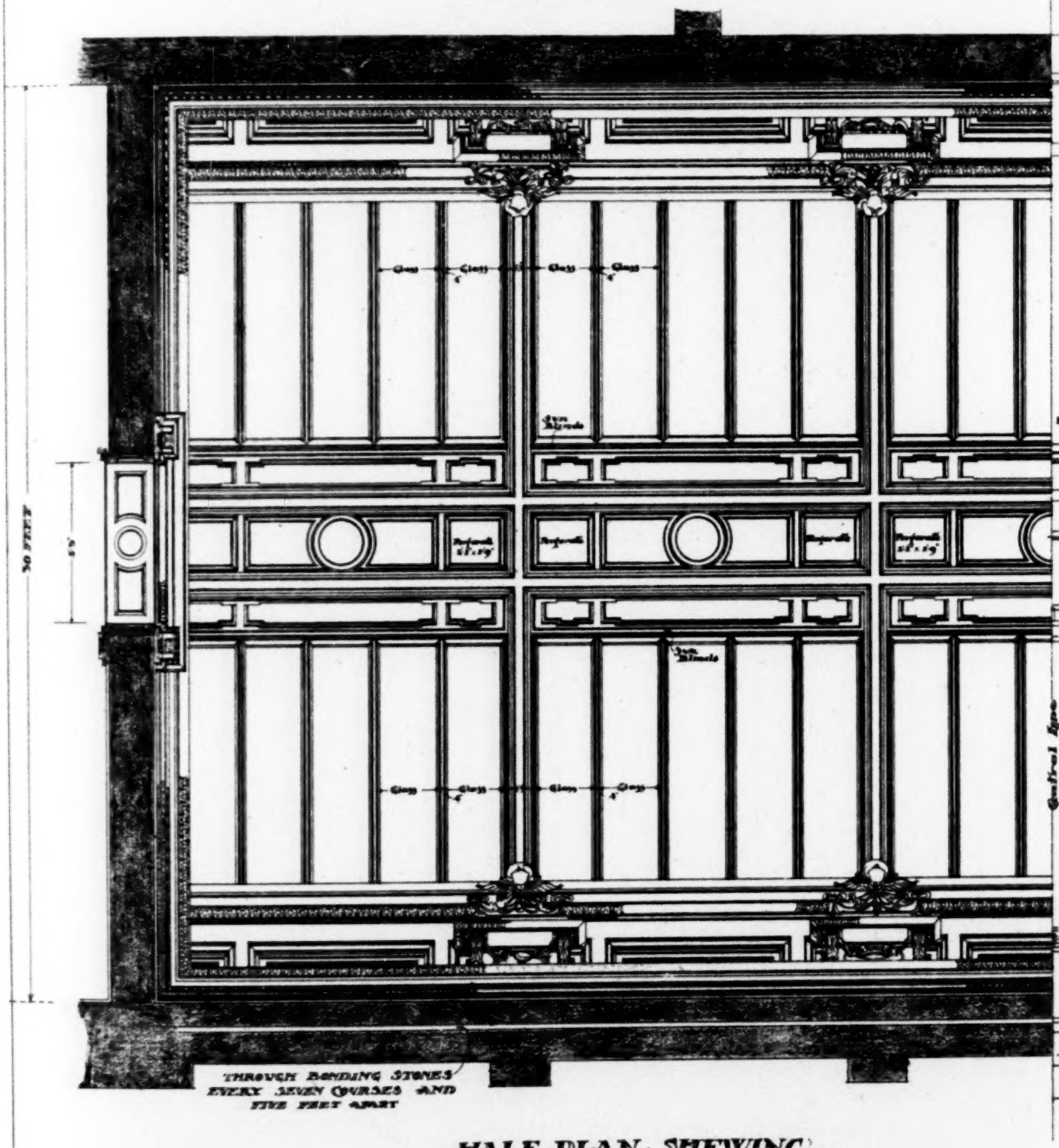
LONGITUDINAL SECTION

PHOTO SPRAGUE & C° LTD 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

Grissell Medal, R.I.B.A., 1902.

DESIGN FOR THE ROOF OF A PICTURE GALLER CONSTRUCTED IN IRON AND CONCRETE

SCALE OF FEET



HALF PLAN SHEWING THE INTERIOR OF ROOF

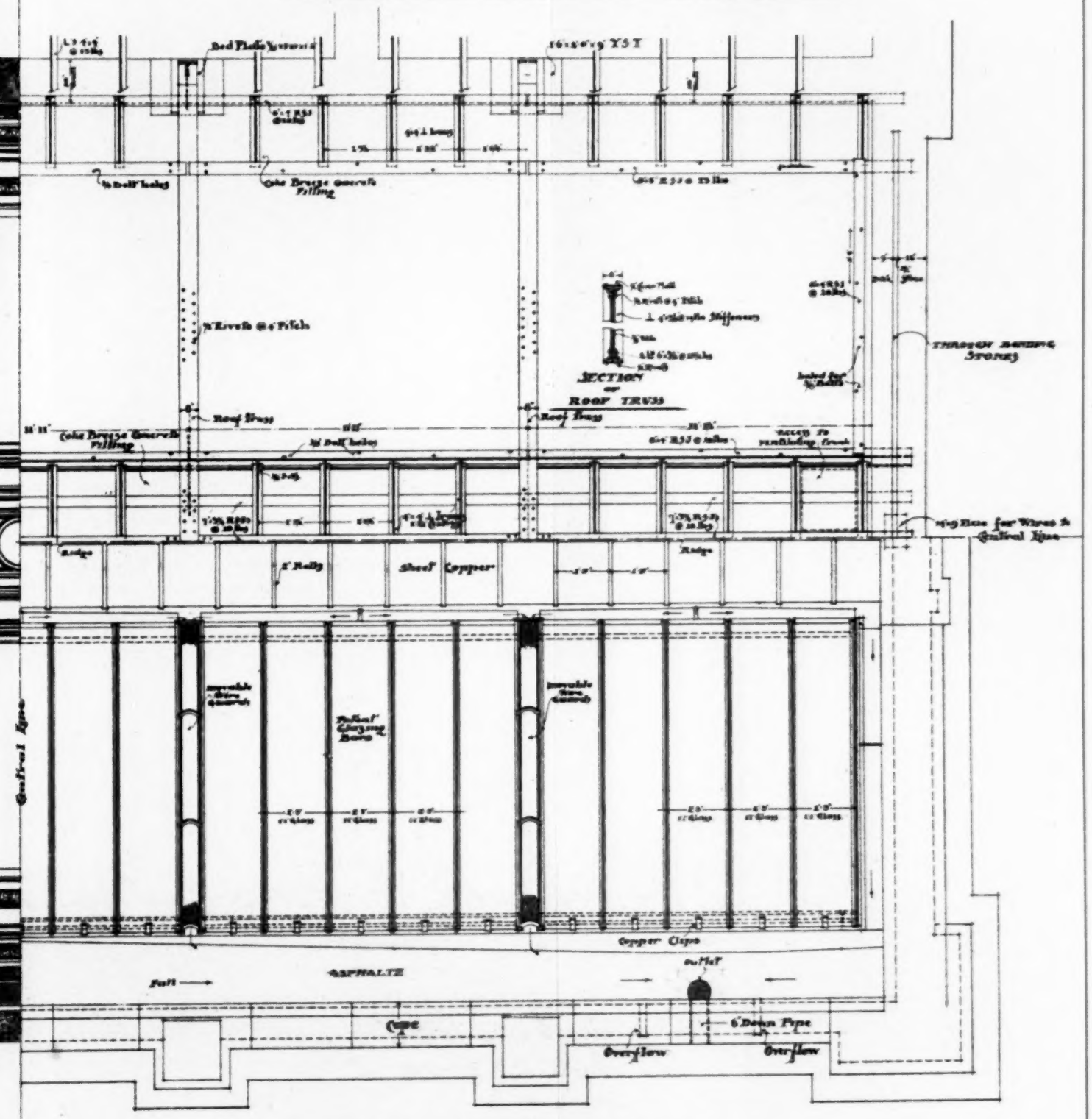
60 FEET

Grissell Medal, R.I.B.A., 1902.

LLERY
E

BY Mr LIONEL U. GRACE

QUARTER PLAN OF IRONWORK



QUARTER PLAN OF ROOF

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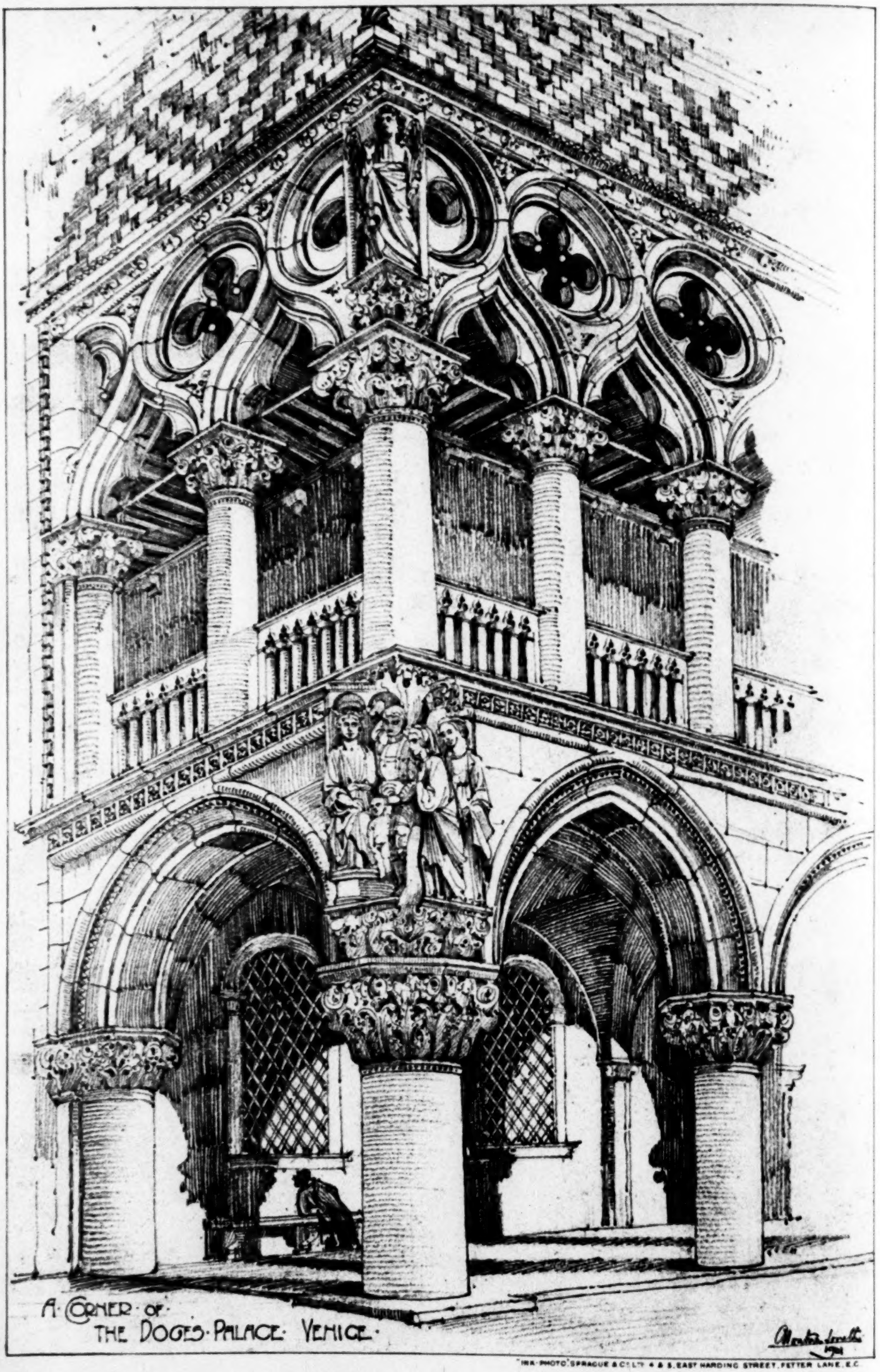
"IRK PHOTO" SPRAGUE & Co LTD 4 & 5 EASY HARDING STREET FETTER LANE E.C.



A CORNER OF THE DOGES PALACE VENICE.

"INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EASY HARDING STREET, FETTER LANE, E.C.

Pugin Studentship, R. I. B. A., 1902.

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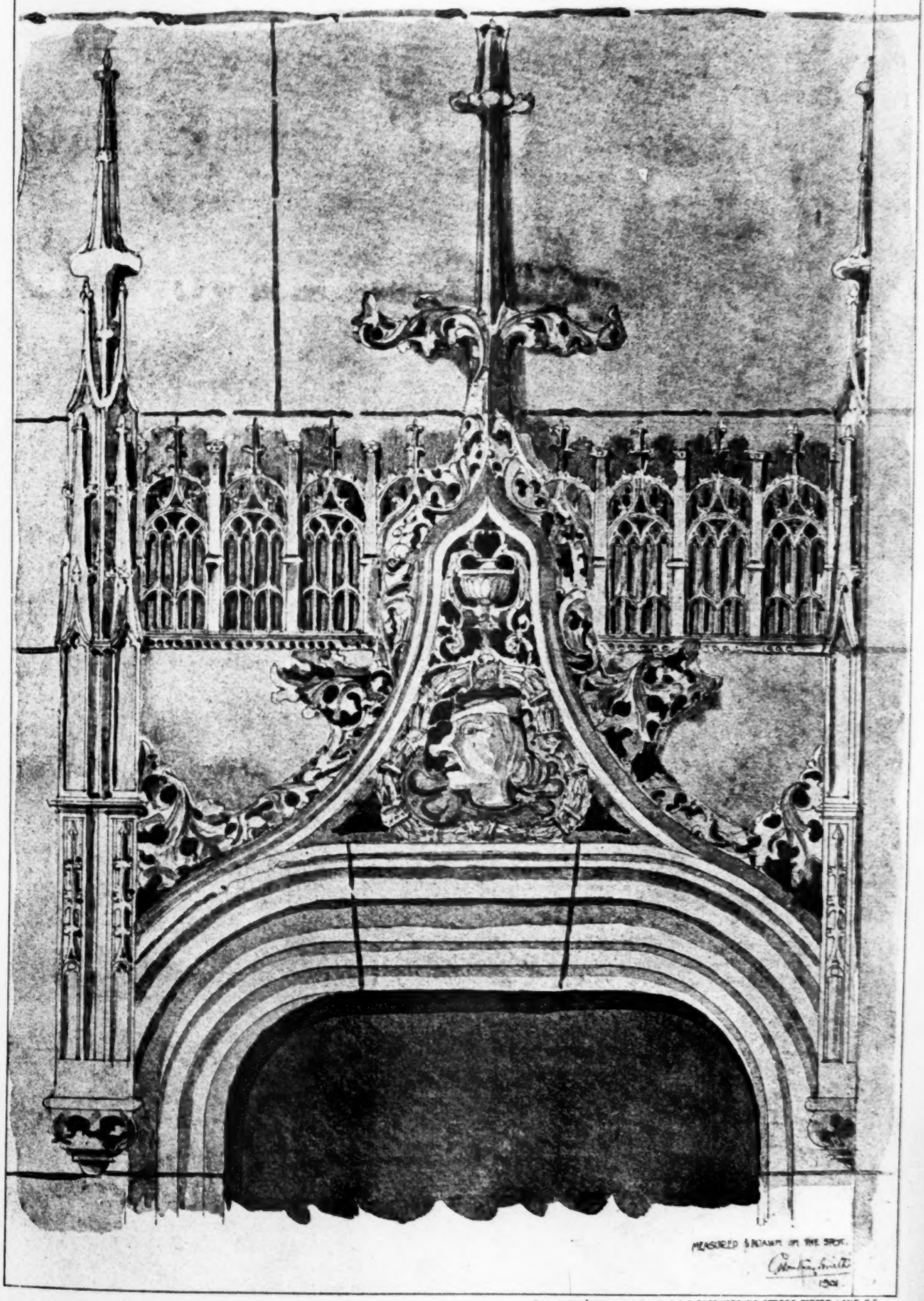
CAUDEBEC-EN-CAUX: NORMANDY.
FRANCOIS PREMIER DOORHEAD.



"IBX-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

Pugin Studentship, R.I.B.A., 1902.

phrase "something further," because to some slight extent the matter was attended to in the University of Edinburgh through the Chair so well occupied by Professor Baldwin Brown—namely, the Chair of Fine Art.—Mr. G. S. Aitken seconded. The Chairman, in supporting the motion, suggested that the matter, instead of being remitted to the Committee of Management only, should be remitted also to the Council. He read a letter from Professor Baldwin Brown, who expressed cordial agreement with Mr. Bruce's motion. Even though the Carnegie Trustees had too many claims before them to permit them to do anything in the matter immediately, it would be a good thing to put the demand for a Chair of Architecture, or some agency of the kind, distinctly before the public. The Chairman added that he had seen a good deal of what was done in the teaching of architecture both in France and America, and he was perfectly confounded with the extraordinary development of the teaching of architecture in these countries. In some cases they had twenty-six or twenty-seven teachers of one kind or another in that subject alone. Why should it not bulk more largely in Scotland? The motion was unanimously adopted. Afterwards Mr. Wilson Beatson read a paper, written by Mr. James Miller, I.A., on the "Glasgow International Exhibition of 1901." The paper was illustrated by drawings, photographs, and limelight views.

ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—At the general meeting on the 2nd inst., Judge Baylis, K.C., in the chair, Mr. J. C. Prætorius exhibited a Venetian point lace apron, kindly lent by Lady Reade, of Carreglwyd, and supposed to have belonged to Lady Jane Plantagenet, Maid of Honour to Queen Elizabeth. Mr. E. Towry Whyte exhibited several rare Egyptian antiquities from his collection, notably a small bronze mummy-case in the shape of a fish, together with the bones of the perch (*Lotus Niloticus*) which were found inside; a wooden bolt of ingenious construction; and a drill boss of granite of small size. Mr. Whyte suggested that if the boss heads of this form were used in connexion with making fire, the symbol of Rā, the Sun, was derived, which would account for the dot in the centre. Mr. E. B. S. Shepherd then read a paper on the "Church of the Greyfriars in London." He said that of the monastery of the Greyfriars, Friars Minor, or Franciscans, which once occupied the ground where Christchurch, Newgate-street, and Christ's Hospital, now stand, but little remains. But the later buildings follow to a great extent the lines of those which preceded them; and much information fortunately exists concerning the monastery in an account of the house, together with a list of persons buried in the church, compiled about the year 1526 and preserved among the Cotton MSS.; the account itself is familiar to scholars from the transcription printed by Brewer in his "Monumenta Franciscana," and the list of burials from the abridged and somewhat inaccurate copy in J. G. Nichols's "Collectanea." The convent was founded near Newgate in 1225, and the various buildings of which it consisted were built for the friars by citizens of London during the thirteenth century, the chapel being built by Sir William Joiner, Mayor in 1238. Towards the end of the century this convent attracted in an extraordinary degree the patronage of Royal and noble persons. It received benefits from Henry III., from Gilbert de Clare, Earl of Gloucester and his sisters, from John, Duke of Brittany, "specialissimus pater et amicus fratrum minorum," and many others. In 1306 Queen Margaret, the second wife of Edward I., began to build a new church for the friars on an enormous scale; and this was finished in 1348, by the assistance of many exalted persons, including Queen Isabella and Queen Philippa. The number of burials in the church was very large, about six hundred being mentioned in the Cotton MS. Amongst these were the Queens Margaret and Isabella, Margaret Segrave, Countess of Norfolk, granddaughter of Edward I., and Robert Lord de Lisle, to mention only a few of the most important; and some whose bodies were buried elsewhere, Eleanor, wife of Henry III., Archbishop Peckham, formerly Provincial Minister of the Friars Minors, Edward II., and others, received spiritual benefits from the friars by the burial of their hearts within the walls of this church. The main arrangements of the church can be made out with certainty; it was about 300 ft. long and occupied the whole of the ground now taken up by Christchurch, Christchurch passage, and the present burial ground; in width it was divided into three alleys, a wide one in the middle and a narrower one on either side, and in length into fifteen bays, of which the first six on the east correspond with the six bays of the present Christchurch; the seventh bay coincided in width with that of the existing tower, the eighth with Christchurch passage, and the remaining seven with the graveyard. The first seven bays on the east contained the quire in the central alley and two chapels in either of the aisles; on the north were the chapels of Allhallows and of St. Mary; on the south those of the Apostles and St. Francis. The eighth bay, as now, was a passage, and is described in the Cotton MS. by the designation "Ambulatorium inter chorum et Altaria," "the altars" forming the eastern bay of the nave; over it stood the tower, poised, perhaps, as at King's Lynn, over the two parallel arches which spanned the central alley at this point. At either end of the passage were doors, that on the north leading to the monastery, that on the south to Newgate-street. In the eastern arch of the nave was placed the rood, and against the screen beneath it crossing the church were four altars, in the north aisle that of St. Mary, in the nave the altar of the Holy Cross and the Jesus altar, one on either side of the rood, and in the south aisle the common altar, "altare commune," the space before these altars being enclosed by screens from the rest of the church. In addition to the main divisions of the church, it is possible from the list of burials to fix with considerable certainty the positions of altars, stalls, piscinas, and other fittings, and by a comparison with the Blackfriars' church at Norwich, a very probable conjecture can be made concerning the first church which preceded that begun by Queen Margaret in 1306. It seems to have coincided with the north aisle of her quire, and it is by no means impossible that instead of pulling down the old church, she made it serve as an aisle to the new one. The remains of friars' churches are scanty in the extreme, so that the fullness of the information concerning this one is particularly welcome.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—A meeting was held on April 2, Mr. C. H. Compton, Vice-President, presiding. Mr. Thomas Sheppard, Curator of the Hull Municipal Museum, submitted a drawing of one of two small bells recently found in the course of excavations near Duffield. The bells bear neither inscriptions nor dates, but are precisely similar in shape and measure—6½ in. in height by 6¼ in. in diameter at the mouth. They were probably used at the altar, and were sacring bells. Dr. Winstone exhibited some beautiful lacework of the seventeenth century, representing Herod and Herodias with her daughter bearing the head of John the Baptist on a charger or dish. A memorandum stated that the lace was worked with thread which cost one guinea per ounce, and the dresses of the figures are profusely ornamented with small pearls. Mr. I. C. Gould exhibited two casts, one square, the other round in form, of white metal coated with copper recently dug up in a garden at Upminster. He had submitted these casts to Mr. C. H. Read and Mr. Hill, of the British Museum, and found that the square specimen bears on its face the cast of a well-known coin of Syracuse, the other being the cast of the obverse of an Italian medal of the sixteenth century. Mr. Gould thought that, though possibly modern forgeries, the casts may more probably be imitations of the antique made fifty or more years ago, not necessarily with the idea of deception. Mrs. Marshall brought for exhibition a piece of glass seemingly Roman, beautifully iridescent, which she had herself picked up at Alexandria. Dr. Birch exhibited, on behalf of Miss Gertrude Winstone, the photograph of an incised leaden plate found recently at Bath, which was of much interest. It appears to have been nailed or fashioned in some way upon a coffin or chest containing the remains of a sister or nun named Alfgifu, a deceased member of the celebrated nunnery of Bath which was first founded in A.D. 676 by Osric, petty king or subregulus of the Wicii, a tribe inhabiting Worcestershire and adjacent countries. Bertana was the first Abbess. The period of the nunnery, A.D. 676-775, must be that of the relic in question, which consists of a leaden plate 4¼ in. in length by 3½ in. in width, bearing on the front an incised Greek cross, with a circular border uniting the arms, and a St. Andrew's cross at the intersections; the back of the plate has simply a plain Greek cross. The arms of all the crosses as well as the circular border are covered with inscriptions of sacred characters, partly decipherable. The relic was discovered by Major Davis at about 17 ft. below the present level of the ground, in a portion of the hypocaust of the old Roman baths, the site of which was afterwards the cloister of the Saxon nunnery. A valuable paper on "Maiden Castles" was read by Mr. A. R. Goddard, of Bedford. This interesting subject was very ably treated, and at considerable length, Mr. Goddard having traced a list of at least twenty-six pre-Roman encampments bearing this singular title, which is also applied to roads and ways, a title that would seem to have been given to these encampments, not by the original makers, but by a people that came into the country long after their time, when the old ramparts and trenches had been left in desolation for many centuries. After reviewing the various theories as to the origin of this name and its meaning as applied to these early strongholds, Mr. Goddard observed that the word "maiden" is certainly a Saxon word, and the map seems to confirm the idea that the Saxons bestowed it upon these fortresses, for it shows that they occur all over the country which was Saxonised, even where, as in Cumbria and Scotland, a short Saxon lordship was later displaced by the prevalence of the peoples of Celtic origin. If, then, the name is Anglo-Saxon, the special reason for its application to these deserted and desolate early strongholds, situated as they are generally in wild and open country, is of particular interest. The Anglo-Saxons did not attach this name to forts of their own construction, and the map, Mr. Goddard pointed out, seemed to suggest that its application to these much earlier strongholds was owing to the Danish invasions. He ventured to suggest that when, in the eighth and ninth centuries, the Danes came ravaging the north-eastern parts of the country, and the towns of the Saxon-English were incapable of defence, owing to neglect, it was imperative to find a place of security for the women and girls and children, when the men had gone out to fight the invaders. Then these deserted enclosures in the hills and wilds were thought of as places of refuge, and in after years may have become known and pointed out to younger generations as the "Maiden Bushes and Ways," just as the glens and vales in Scotland, where the Covenanters met, were pointed out to those that came after them; and in lapse of time the old names lingered on, while their meaning was forgotten. The Rev. H. J. D. Astley (the Chairman), Mr. Gould, Mr. Duppa Lloyd, and Mr. Patrick took part in the subsequent discussion.

ENGINEERING SOCIETIES.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—At a meeting of the Civil and Mechanical Engineers' Society held on the 3rd inst. at St. Ermin's Hotel, Westminster, Mr. E. Ault read a paper on "The Ventilation of Drains and Sewers." He began by quoting the maxim laid down by Dr. Carpenter, that "motion is the first sanitary law." Air was an active carrier, a sustainer of health and life. The freer the action of air the better it was for the preservation of health. It was the province of the engineer to devise means for ventilation, and efficiency should be his chief aim. Attempts at ventilating drains and sewers so far had been crude. The lecturer then considered the various points essential to efficient ventilation of drains and sewers. Sewage always gave off gases, and their constitution and nature had been made the subject of experiments by various engineers. He dealt with the minimum volume of air necessary for ventilation, the direction that ought to be given to the flow of air, and the mechanical means for producing flow. In this connexion he described his apparatus for ventilating sewers, showed the essential and practical elements of design in ventilating apparatus, the working of fans and motors, and examples of practical application of elements of design, a great many of which were shown on a screen. In conclusion, he said he had tried to convey to his hearers in a brief manner the essential principles of his system of sewer

ventilation, and he hoped he had given the chief points in dealing with the sewage of towns as affecting the health of their inhabitants. A discussion followed, in which Messrs. Brewster, Hodgson, Ackermann, and Shone took part, the latter observing that there was no branch of engineering more neglected than sanitary engineering, and yet nothing was more important for the welfare of the population.

SOCIETY OF ENGINEERS.—At a meeting of this Society, held at the Royal United Service Institution, Whitehall, on Monday, the 7th inst., Mr. Percy Griffith, President, in the chair, a paper was read on "Australian Timber Bridges and the Woods used in their Construction," by Mr. Herbert E. Bellamy, City Engineer, Rockhampton, Queensland The author, at the outset, pointed out that bridges built entirely of timber were now seldom erected in England, but that in the Colonies timber bridges were very extensively constructed. He then proceeded to discuss the life of such bridges, which, he said, was very varied, but might be put at from thirty-five to fifty-five years, according to location and other circumstances. He then proceeded to describe a timber bridge which he had recently designed and erected in Queensland. This bridge is 320 ft. long and 18 ft. 6 in. wide. It spans a creek 10 ft. deep at high water, and which also has 20 ft. of black mud below the bed. In flood times the waters rise 25 ft. above the level of ordinary high-water mark. The piles, which are of ironbark timber, well creosoted, were dealt with in detail, the sizes, lengths, methods of scarfing, driving, tests, and covering with Muntz's metal being given. The cost of driving the piles complete, including materials, labour, plant, &c., was given at 4s. 6d. per lineal foot. The decking and its members are of spotted gum, and the cost was stated to be 9os. per square, including all material and labour. The total weight of all the timber in the bridge as fixed is about 200 tons, whilst the weight of the ironwork fixed is 4½ tons. The total cost of the structure, including a small portion of the approach roadway, was 1,900*l*. The author then described the different varieties of Australian timbers—seventeen in number—mostly used in bridge building and for other constructive purposes, specimens of all of which were exhibited. The author referred to the distribution in the Colonies, and the qualities, &c., of the principal trees. The strengths and sizes of the leading timbers were also given. Of different kinds of timber suitable for bridges, ironbark, spotted gum, blue gum, bloodwood, blackbutt, box, mahogany, karri, and swamp mahogany were stated to be amongst the most durable. Ironbark, mahogany, blue gum, bloodwood, swamp mahogany, turpentine or peppermint, tea, she pine, and cyprus pine are very durable when constantly immersed in water or in wet ground, and are therefore well adapted for piles, &c., for the foundations. Karri, which is a member of the eucalyptus family, is largely used for street paving. The author expressed the opinion that the good qualities of Australian timbers were not fully realised, otherwise these woods would be more extensively used both in Europe and America. The author next described in detail the appearance of good timber, the chief qualification being slowness of growth as shown by the narrowness of the annual rings. He then elaborated the various methods of seasoning, which consist either in evaporating the sap by air-drying, or in dissolving it in water and afterwards sun-drying the timber. Artificial drying is rarely resorted to with timber for engineering purposes. The author then passed on to a consideration of the general causes of decay and the destruction of timber by worms and insects. The destructive methods adopted by the white ant and the *teredo navalis* for invading timber were explained, and the means employed for its protection against these pests were pointed out. It was stated that copper sheathing was not permanently effectual in resisting the attacks of the *teredo*, but that creosoting, properly carried out, was the most successful of any process yet known. The preservation of timber was then considered, and the author dealt with painting, charring, creosoting, and impregnation with metallic salts. The latter method, however, has not in all cases given satisfactory results.

SCOTTISH ASSOCIATION OF MUNICIPAL ENGINEERS AND SURVEYORS.—This Association, which is now formed, held its inaugural meeting on the 5th inst. in the Athenæum, Glasgow, and was attended by representatives from thirty-four burghs and other authorities in Scotland. The constitution, which had been prepared by a provisional committee, was submitted for approval, and adopted. The meeting proceeded to appoint the officials of the new Association, and the City Engineer of Glasgow, Mr. A. B. M'Donald, was unanimously appointed the first President. The vice-presidents are Mr. A. J. Turnbull, Greenock, and Mr. Thomas Nisbet, master of works, Glasgow. The first general meeting of the Association is to be held in Edinburgh in June next, when the President will give his address.

SANITARY INSPECTORS' ASSOCIATION.

AT the monthly meeting of the Sanitary Inspectors' Association, held on Saturday at Carpenters' Hall, London Wall, further consideration was given to a scheme of amalgamation with different associations in the United Kingdom. The Council submitted a proposal for federating with the South Wales Association, the National Union and Sanitary Inspectors (North-western Counties) and the Scottish Association.

In the subsequent discussion several representatives from the provinces spoke in approval of the scheme—notably members from Middlesbrough, Batley, and Lincoln. On a vote the principle of federation was approved by twenty-five against thirteen. The Council was then instructed to enter into negotiations with the other associations named.

PRESERVATIVE PROCESSES FOR WOODWORK.

BY H. C. STANDAGE.

THE various changes of temperature and of humidity and dryness to which woodwork in building is subjected renders it almost impossible to formulate a universal remedy against decay. It is a well-established fact that the most destructive agency causing decay in wood is the subjection of it alternately to wet and dryness. Wood that has been kept continually in water has remained sound for a much longer period than has wood which has been allowed to become wet, then dry, then wet again, &c. The various positions in which the wood is located determine to a great measure the means of protection required, next to which comes the nature of the wood itself, some woods being less subject to decay than others.

In the following processes means will be found of finding a remedy for almost every case of wood requiring preservatives from exceptional decaying influences.

Preservation of Wood against Fire.—Methods for the impregnation and painting of wood with materials that resist fire have been patented in scores, each of which processes have been extolled by the inventors as being the acme of perfection. From the writer's experience with such compounds, the best preservative agents are such non-combustible substances as soap, glue, gelatine, &c. A soap varnish is one of the best possible compounds for preventing light woodwork readily igniting. Such varnishes are made thus:—Dissolve good tallow soap (commercial "curd" soap is such an one) in warm water to a thin fluid of the consistence of milk, and then reprecipitate the soap from the fluid by gradually adding a solution of sulphate of copper, sulphate of iron, and any other mineral solution which form soaps with oils and fats—*e.g.*, sulphate of magnesia, &c. The flocculent precipitate is collected, washed in water, and then dissolved in warm oil of turpentine to the consistency of varnish. The fluid thus made possesses all the properties of a varnish, and it is applied to the woodwork in the same manner; for plain unstained wood, which should first be sized with glue or gelatine, such soap varnishes are excellent, as they will not readily blister by the fiercest heat, and except the wood be held in a furnace or otherwise be subjected to fierce heat, it will not be consumed or ignite. If the wood be of a soft porous nature it may be impregnated with the sebaceous matter by these means: steep the wood for some time in a boiling hot solution of soap, and then steep it in a solution of one of the metallic salts mentioned above. Good tallow soap only should be used, not a common soap which contains rosin or other adulterating bodies in "fillers." By this means the sebaceous matter will be precipitated in the pores of the wood, and thus render it fireproof for the light framework of scenery in a theatre and similar structures which are subjected to risk of ignition. This process forms a good preservative one.

Waterglass, the chemical name for which is silicate of potash or silicate of soda, is a substance which renders wood incombustible. The method of treating the wood is to dilute 1 part of waterglass with 3 times its bulk of water and steep the wood in the solution for 24 hours; then allow the wood to dry in the air for a few days, and afterwards repeat the steeping for a further period of 24 hours, and again dry. Repeat this three or four times, and finally completely dry the wood and lay on it a compound composed of 1 part of cement with 4 parts of waterglass. Allow the first coat to dry, and in 24 hours give a second application of the compound, but not more cement in it, and after this has dried, brush over it a solution of waterglass only which will give the wood the appearance of being varnished. Wood so prepared is perfectly fireproof, and also proof against rotting, insects, &c. In using the cement compound only mix just as much as can be used at a time, as it sets very quickly.

The following three processes are from an American source:—

To Render Wood Fireproof and Flexible.—These results are obtained by saponifying the rosin in the wood, and the acids in same neutralised with alkalies obtained from wood ashes (potash pure and simple). The carbonates of alkaline bodies are preferable for saponifying and rendering vegetable bodies more or less flexible and fireproof, therefore dissolve carbonate of potash or of soda in cold clear water, and add calcic hydrate (slaked lime) to the solution, and soak the wood in this alum solution until a coating $\frac{1}{16}$ in. or more thick has been formed on the surface. This will be accomplished in five or six hours. A ¼-in. thick coating will be sufficient to render building timber fireproof, but in case great flexibility with absolute non-inflammability is desired a thicker coating, or even an entire saturation of the timber will be necessary. In this case hydraulic pressure is required to force the compound into the wood.

To Render Wood Incombustible and Impermeable.—The following process petrifies the wood, so to say, without the latter losing its ordinary appearance. It will bear any degree of heat without the primary substance suffering any change except the formation of a very thin charred coating, which falls off on the slightest touch. The process is as follows:

Heat in a boiler

55 parts of water to 113 deg. F., and then add

55	„	sulphate of zinc,
22	„	potash,
44	„	alum, and
22	„	manganic oxide.

When all are dissolved add gradually 22 parts of sulphuric acid of 66 deg. until the compound is thoroughly saturated, then place the pieces of wood into the compound in such a manner that they lie about 2 in. apart, allowing them to remain for three hours, and then dried in the open air.

Another method of rendering wood fireproof is to boil the wood first in a solution of potassic sulphate and after drying, heat it together with a mixture of coal-tar and argillaceous admixture by which it acquires a durable coating of a mixture of asbestos and fireclay. Heat the wood thus treated in a steam vat between layers of clay, whereby the coating is firmly united with the wood. Timber prepared in this manner is fireproof and weather-proof and well adapted for building purposes.

Waterglass when used alone as a fireproof coat for wood should be thinned down with five or six times its own bulk of water and several coatings given, allowing each one to dry before putting on the next. The water should be soft, *i.e.*, free from lime, and the solution applied warm. Before applying it, all grease should be removed from the wood.

Fireproofing Fluids.—Ingredients:—

Sulphate of iron (green vitriol, *i.e.*, copperas).
Alum.
Pipeclay.
Water.

Preparation.—Dissolve the alum and iron sulphate in water until no more will dissolve in it, *i.e.*, that is a saturated solution is obtained,

paint the wood with this solution hot, giving two applications following each other, and allow it to dry. Meanwhile mix in pipeclay with a weak solution of sulphate of iron to the consistence of paint, and then paint this on the woodwork (for use on shingles, &c.).

Ingredients :—

2½ parts of sulphate of zinc.
2½ parts of alum.
1 part caustic potash.
1 part manganic acid.
1 part sulphuric acid.
1 barrel of hot water.

Preparation.—Put the first three bodies into the hot water and then, when dissolved, add the manganese oxide, and lastly the acid.

Pack the shingles loosely in another barrel and fill with the liquid, holding the shingles under the mixture. Fill up the first barrel also with shingles, soak for three hours and pile to dry, and repeat until all the shingles are fireproofed. After the house is shingled paint with oxide of iron paint tempered with other mineral colour in boiled linseed oil, and mixed to suit the taste or shade of colour desired.

No. 3.—Burnell's process (known as burnellising) of rendering timber fireproof consists in treating it to a solution of chloride of zinc prepared by dissolving 1 lb. of chloride of zinc in 4 gallons of water. Soak the wood in the fluid for forty-eight hours for every inch of thickness, and afterwards allow to dry, which will occupy fourteen to ninety days.

No. 4.—Ingredients :—

1 part alum.
1 part sulphate of copper (blue vitriol, or bluestone).
100 parts of water.

Dissolve the salts in a small quantity of hot water, and then mix it with the bulk of water and steep the timber in the fluid for four to five days, weighting down same so as to thoroughly immerse it; then take out the wood and dry it thoroughly before being used.

No. 5 (*Payne's*).—This process consists in impregnating the wood in a vacuum with a strong solution of sulphate of iron, and afterwards forcing into the timber a solution of sulphate of lime, or any of the alkaline carbonates, such as carbonate of soda, by which means the oxide of iron becomes insoluble and the wood rendered incombustible.

Non-inflammable or Fireproof Paints.

No. 1.—Ingredients :—

2 lbs. finely-pulverised glass.
2 „ „ porcelain.
2 „ of any sort of stone in powder.
1 „ calcined lime.
3 „ silicate of soda (water glass), commercial strength.

Preparation.—Pulverise the solid ingredients as finely as possible, and mix them by sifting through a sieve; then moisten them with water, and intimately mix them with the water-glass. This yields a mass of syrupy consistence, that may be employed for painting, either alone or mixed with colour. The addition of the lime gives a certain unctuosity to the mass for whitewashing, and its combination with the silicic acid of the soluble glass serves to bind the other materials together. These elements may even be replaced one by another, but it is always well to preserve the lime. Potash instead of soda water glass may be used, but the latter is less expensive. The coating is applied with a brush as uniformly as possible over the surface to be protected. The first coat hardens immediately, and a second one may be applied six hours or more afterwards. Two are sufficient.

No. 2.—Ingredients :—

1 part common lime, freshly slaked.
1 „ hydraulic lime.
1 „ siliceous or argillaceous matter (as sand or pulverised slate).
Cow's milk, q.s.
Colouring matter (ordinary pigment), if desired.

Preparation.—Mix the solids with sufficient milk to give the compound, when thoroughly mixed, the proper consistency for laying and spreading with the paint-brush.

The use of chloride of zinc and of water-glass has two drawbacks which militate against their extensive use, thus: A paint consisting of zinc chloride volatilises when the material on which it is spread is heated or exposed to flame and its vapours are insupportable by human beings. It would, therefore, be difficult, if not altogether impossible, to enter wooden dwellings painted with the zinc salt when on fire, and thus the salvage of furniture, &c., would be obstructed. The water-glass paint, on the other hand, is liable to be washed away when exposed to rain or other watery influences; and so likewise with the alum and sulphate of copper compound, this is liable to be washed out, more or less, from the wood.

Waterproofing and Preservative Processes against Dry Rot, Insects, &c.—Lime salts convert soaps into insoluble matters. Advantage is taken of then saturating the wood first with a solution of soap in water, and then submitting the saturated wood to the action of a salt of lime or else steeping in an acid. The soap that has penetrated the pores of the wood is decomposed and formed into calcic sebate, which fill the pores with an insoluble compound. Another process of using lime as a preservative of wood is slake lime (calcic oxide), in a solution of chloride of lime, and use this as a wash for the wood.

This wash is a preservative against insects more than against water. Saturating the wood with common salt is also a good preventer of insects attacking the wood. The wood, if planted in the ground, may be set in a bed of salt, which, by being gradually dissolved, is absorbed by the wood.

For pine, acacia, larch, beech, cherry, poplar, and alder wood, a solution of sulphate of copper is a good preventer of ravages of insects in the wood. (14 ozs. of the sulphate per 10 gallons of water is sufficient strength for the solution).

Coal tar is a familiar agent in use for preserving wood from dry rot. The process of impregnation is this :—Let the wood be as well seasoned as possible, and steep it for a quarter of an hour in the following mixture :—

To 50 parts of boiling hot coal tar
Add 3 parts of common salt,
5 parts of sulphate of iron,
3 parts of alum,
13 parts of rosin.

Mix thoroughly and boil the compound to the proper consistency. As soon as the wood is taken from the compound a powder consisting of the following ingredients is spread over it :—

Coal cinders very hard and thoroughly burned	50 parts.
Sulphate of iron pulverised	5 „
Lime pulverised	15 „
And glass pulverised, any quantity	95 „

Store the wood then prepared in a dry place.

Rosin is also a substance which will retard the decay of wood from rotting, but as it is a substance which is decomposed by the action of alkalies it would not preserve wood which is subjected to the action of alkaline waters. The best method of using this substance is to combine it with the following ingredients :—

25 parts of rosin.
2 „ linseed oil, fluid measure.
150 „ white sand.
1 pint sulphuric acid.
1 „ black oxide of copper, finely ground.

Preparation.—Melt the rosin at a gentle heat and then stir in the oil, and when this has mixed, gradually mix in the sand with constant stirring, and finally mix in the acid and the copper oxide; incorporate well, and paint the compound on the wood while hot.

A modification of the above compound is composed of the following ingredients :—

4 to 8 parts of linseed oil.
50 parts of rosin.
40 parts of whiting.
200 to 300 parts of sharp white sand.
1 part of red oxide of copper.
1 part of sulphuric acid.

Preparation.—Boil the oil and rosin together and then mix in the whiting and sharp sand, and when this pasty mass is thoroughly boiled add the red oxide, and lastly the sulphuric acid. Stir up well, and lay the compound on hot with a stiff brush. It dries at once, and forms a crust as hard as stone.

Carbolic acid and creosote are antiseptics, and are generally considered waterproofers of wood; but this is not the case, as in process of time the wood fibre will rot away, notwithstanding that it is perfectly permeated with the creosote. So much so will the wood decay, that although it retains its form, there will be nothing combustible left in it; that is, such rotted wood will simply smoulder like so much tinder, evincing that the resins in the wood have been absorbed, or otherwise changed in nature as to lose their combustibility. Creosote is largely used for impregnating railway sleepers to prevent dry rot, for which purpose special apparatus is used; but for ordinary wood posts, palings, and wooden shanties, an application of the coal tar by the aid of a paint-brush is sufficiently efficient.

Another successful antiseptic or preventer of decay from insects is corrosive sublimate (chemically called bichloride of mercury). The method of application was generally known as "kyanising." A saturated solution of the salt is made in a wooden tank, which is constructed in such a way that no metal comes in contact with the fluid in the tank, and in this solution the wood to be "kyanised" is steeped on an average of 24 hours for every inch in thickness for boards and small timber, but for large baulks two to three weeks are required. The proportion of corrosive sublimate varies according to the porosity of the timber to be saturated; the maximum amount is 1 lb. of the mercury salt per 10 gallons of water (tepid is the best to use, as it dissolves the salt more rapidly) and 1 lb. per 15 gallons the minimum. A load of timber, 750 cubic feet, will be saturated by the aid of 1½ lbs. of the salt in the requisite quantity of water. By the Rayner process, the wood, while in a vacuum, is impregnated with Other processes that have been used of impregnating timber with fluids, so as to preserve the wood from the ravages of insects and also against dry-rot, are the following :—(*a*) The wood is first steeped in a solution of phosphate of soda containing 7 per cent. of the salt; the wood is allowed to dry, and then treated with a solution of chloride of barium containing 13 per cent. of this salt, whence phosphate of barium is formed in the fibre of the wood. (*b*) The wood is boiled in a solution of gallo-tannic acid (the proportion being immaterial); the result is the formation of an insoluble substance in the pores of the wood. One solution only is necessary for oak, as there is naturally present a great deal of tannin in oak, which is naturally a preservative against insects. A modification of this process was to steep the wood in a solution of acetate of iron; after steeping, the tannin acid bath.

(*c*) The timber, cut in proper lengths, is packed vertically in an iron reservoir provided with a tight-fitting cover. This vessel is three-fourths filled with a solution of carbolate of soda. Live steam is then ejected into the vessel to bring the fluid to the boiling point, and the injection of steam is continued until by its condensation the vessel becomes filled with fluid. The wood is then allowed to remain in the hot liquid some hours, when the fluid is drawn off and the wood washed off with a dry steam jet.

(*d*) Paraffin is dissolved in petroleum, ether, kerosene, or other convenient substance, and the wood to be preserved is steeped in this fluid, the wood being as dry as possible before being put in the fluid. After the timber has become thoroughly saturated it is heated in a large retort provided with a condensing arrangement whereby the volatile solvent is expelled and condensed for use over again, while the solid paraffin is left in the pores of the timber.

(*e*) The wood is impregnated with a solution of chloride of zinc or some other soluble antiseptic mineral salt; then the outer layers of the wood are dried by heated air currents, and finally saturated with hot creosote oil, which prevents the soluble antiseptic being washed out.

(*f*) Dissolve 1 lb. of arsenious acid in
4 gallons of water, and add
1 lb. of carbonate of soda.

Stir this mixture until the soda has dissolved. Separately dissolve 16 lbs. of sulphate of copper in 16 gallons of water. Mix these two solutions together and place them in a wooden or lead-lined vat. In this bath steep the timber and heat the fluid to boiling point by the injection of steam. A few hours' steeping is required when the fluid is heated, but if not the wood requires two or three days. For wood already *in situ* this fluid is also applicable by laying it on with a brush several times, allowing each application to dry before giving the next; if used hot they are more efficacious.

Preservative compounds to be applied with a brush to the surface of wooden structures, posts, lintels, door-jambs, garden rails, &c., are very numerous. The following selection represents the most important :—

1. Grind up sub-sulphate of iron—the refuse of the copperas pans—with any common oil, and then with coal tar oil in which a little pitch has been dissolved. This compound is flexible and waterproof.

2. Apply coal tar and sand it over.

3. Boil 1 part (by weight) of sulphate of zinc (white copperas) with 4 parts of coal tar by measure (or 40 ozs. of the zinc sulphate per gallon of tar) and lay this on top.

4. Dissolve 1 oz. of corrosive sublimate to 1 gallon of hot water and lay this on the woodwork top; this will prevent ravages from ants and other insects.

5. Dissolve 8 ozs. of sulphate of copper in 1 gallon of hot water and apply this to the wood while hot.

6. Dissolve 8 ozs. of sulphate of copper, 8 ozs. of sulphate of iron in 1½ gallons of water, and apply as before.

7. To prevent wet-rot, apply paraffin oil or naphtha in which a very little resin has been dissolved.

8. Dissolve 16 ozs. of sulphate of copper in 1 gallon of boiling water, and then add 20 ozs. (by weight) of common sulphuric acid which has been previously mixed with 6 gallons of water. Apply the fluid hot.

9. To destroy worms in wood, apply a literal soaking of benzine (cold, of course). Do not have a light near at hand, as this fluid is very inflammable.

10. To prevent worms in wood, add some sulphur to nitric acid; distil to dryness and expose the distillate to the air until it dissolves, and then apply this to the wood by means of a brush.

11. To destroy worms already present in panels, mouldings, &c., saturate the wood with a strong solution of corrosive sublimate, and afterwards sponge or brush over a little weak liquid ammonia to restore the colour to the wood, and next a weak solution of hydrochloric acid. Stop up the holes with gum and gelatine, and afterwards varnish with a spirit varnish.

Waterproof Paint for Wood.

Ingredients:—
2 gallons of linseed oil.
11 ozs. resin.
11 ozs. litharge.
1½ ozs. red lead.
1½ ozs. umber.
8 ozs. sulphate of zinc.
12 ozs. potassic hydrate.
12 ozs. alum dissolved in 4 gallons of water.

This mixture forms the vehicle. It is prepared by boiling the oil with the resin, litharge, red lead, and umber until a homogeneous compound is produced, then adding gradually the sulphate of zinc, solution of potassic hydrate, and the alum water, stirring the whole well.

For the ground colour, mix
10 lbs. of chalk,
2 lbs. zinc white, with
3 quarts of water in which about
1¼ ozs. of alum have been previously dissolved, and mix with them a solution of 1¼ lbs. of glue in ½ gallon of water.

For use mix this ground paint with 4 lbs. to 5 lbs. of the vehicle and dilute with petroleum.

Another waterproofing compound is prepared by melting ¾ lb. of resin with 6 gallons of fish oil and 1 lb. of melted sulphur; colour the compound with yellow or red ochre, which is best rubbed up with a little linseed oil previously to mixing with the vehicle; give several coats of the compound laid on top. This compound is suited for stone, brick, and as well as for wood.

The plan of charring the ends of posts or of burying them in a bed of charcoal or lime is one generally adopted for fencing-posts. It is more or less preventive of rot, while the charcoal or lime prevents moisture reaching the solid wood, but as charcoal is a ready absorber of gases, incipient rotting eventually sets in. One of the best methods of preventing fencing-posts, gate-posts, and similar woodwork from rotting is the following:—

Bore one or more holes in the centre of the post—the whole length, if desired—and fill the hole with coal-tar and close up with a wedge, well driven home, which will give pressure to force the antiseptic coal-tar into the inner heart-pores of the wood, and thus preserve them internally from moist and dry rot. The outside surfaces of the posts should be coated with a resinous varnish.

Wood exposed to the air should not be dressed with coal-tar, but Stockholm tar or resinous varnish, the former will rot the fibres when exposed to sun and air. Mark the posts at 6 in. or 8 in. above the depth they are to be placed in the earth, and bore the hole up to the mark. Then fill in with boiling coal-tar, plug up the hole, and the base of the post will outlast the upper part. The writer has also had occasion to stand posts under floor joists as a support, when, by making a clay-puddled hole and pouring into it a gallon of boiling coal-tar as a bed for the post to stand in, it would never decay.

Wood used in mines may be preserved by the following method. An iron basin ¼ in. thick, about 6 ft. deep and 4 ft. diameter is sunk in the ground rather more than half its depth. By the side and with its rim below the bottom of the first basin is a second, not quite half its size. A third basin, about midway between the other two in size, stands with its lower edge rather higher than the upper rim of the first basin. This first one is provided with a cover, half of which is screwed on, the other half may be opened or shut close. Above the bottom it has a sieve bottom of wire gauze, and at the bottom a discharge cock. The operation is as follows:—The pieces of wood to be impregnated are cut to the suitable lengths required for door posts, lintels, piles, &c., and placed perpendicularly as closely as possible in the first basin, the cover of which is then closed. It is not necessary that the cover should be airtight. Meanwhile, the third basin has been filled with creosote soda lye, either directly or out of the second basin, by the use of the hand pump. The lye is then admitted into the basin until it is about ¾ full, and then steam is conveyed directly through the pipe mentioned before to the lye. The fluid gradually begins to boil, while it is increased by the condensation water of the steam which pours in, and at last begins to flow away through the pipe which passes over the edge of the second basin; the steam is then turned off, and the wood may be left to boil for some time in the lye. When at last the lye has been discharged and the wood been acted upon by the direct steam, the cover of the basin is opened and the impregnated wood removed. Although wood treated in this way is penetrated with the impregnating fluid only to the depth of ¼ in. to ¾ in., it has been found perfectly unimpaired after five years in districts where wood not so treated rots and becomes unfit for use after nine to twelve months.

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LIGHTING BY ACETYLENE. By Frederick Dye. (E. & F. N. Spon.)

Correspondence.

NEWTON HALL.

SIR,—In your paper of the 5th inst., you have a Note on the subject of Newton Hall, Fetter-lane, in which you remark that it "will shortly give way to new buildings to be erected for the Royal Scottish Corporation" after my designs. You will be glad to know that this is not the case. The keynote of my design is to retain Newton Hall, utilising it for our Pensioner's Chapel, and connecting it with the new buildings which it is proposed to erect with a frontage and goods entrance to Fetter-lane. We only await the approval of the City authorities to some deviations of Fleur de Lis-court, which form an essential feature of my scheme. I should be sorry, indeed, to remove the old Hall, which, as you have pointed out, possesses historic interest, and which, if my design is carried out, will be brought into some prominence, instead of being buried as it now is.

J. MACVICAR ANDERSON.

ANCIENT LIGHTS.

SIR,—I have read with much interest the paper on "Ancient Lights" by Mr. Chatfeild Clarke, printed in your last issue, and it tends to confirm my opinion that the existing law is bad, and very injurious to commercial interests in large towns by the way in which it hampers the erection of new buildings and the extension of old ones. The recommendations of the Joint Committee of the Royal Institute of British Architects and the Surveyor's Institution appear to be good, and would work fairly for all parties; but would it not be better to pass a short Act rescinding the present law and ordering that no windows or other lights in buildings erected after a given date should acquire any right of light at all? Of course, existing ancient lights would have to retain their rights, but it would prevent any new rights being acquired.

The passing of the Act of 1832 seems to me to have been an unwarranted interference with the rights of the owner, who should be allowed to do as he likes on his own land; if he chooses to put out windows close to his own boundary he does it with his eyes open, knowing that the adjacent owner may at any time build up to them.

Mr. Chatfeild Clarke states in his paper that a clause is inserted in the leases of the Crown Estates taking away from the lessees all right of light over adjacent Crown lands, and that this has worked admirably; if so, why not extend this all over the country by law?

It is absurd having laws like the existing one, and our cumbrous and expensive method of land conveyance which hamper the country in competing with a new land like the United States (no right of light can be acquired there), and all they do is to provide fees for lawyers and architects too, who would be much better employed in work more useful to their country.

H. GARNHAM WATKINS.

Nottingham.

THE MOSAIC PANEL, HORNIMAN MUSEUM.

SIR,—I have but recently been able to inspect this work *in situ*, as every one interested in pictorial mosaic applied to exterior walls should do, and compare the effect with the design as published, to judge of the strength or weakness of the colour scheme, and whether the introduction of the architectural background detracts from the clearness of the figures representing the Arts and Virtues. There may be some occult reason for cutting up the pilasters of the pavilions with reeds and twists, and for the thin architraves and cornices over them, which is not apparent to the ordinary mind. But what concerned me much was the denudation of surface, where a large patch of backing with the "keys" revealed seemed to indicate that a portion of the work had fallen away from the wall and was under repair, *i.e.*, if I am right in supposing the whole subject had been completed. If there is a tendency of any particular putty to force out the surface, or any accident of weather likely to affect the stability of new mosaic, one would be glad of some hints from practical workers as to this case; for it cannot, I think, be urged as an objection to the material that it is very liable to failure, though it is stated that the weight of tesseræ may "*drag in* the putty"—here it looks as if it had dragged it *out*. It is rather serious, if not explained as an exceptional case.

A.R.I.B.A.

The Student's Column.

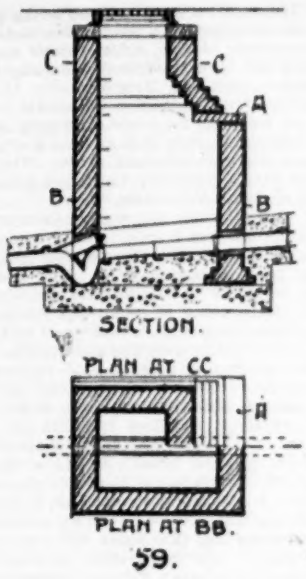
PART II.—DRAINAGE.

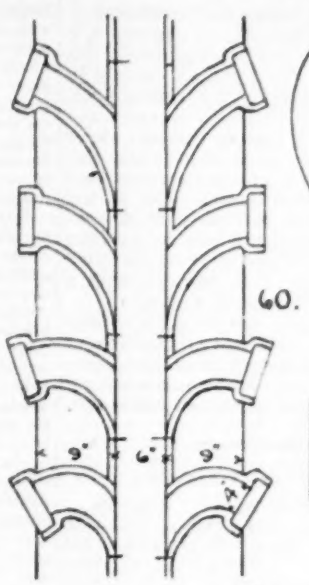
CHAPTER 13.—THE CONSTRUCTION OF ACCESS CHAMBERS.

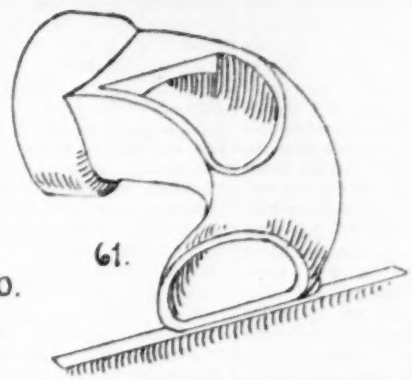
ACCESS chambers or manholes are of various kinds. Their primary purpose is to facilitate the inspection, cleansing, and periodical testing of the drains. If the chambers are placed in suitable positions, every main and branch drain can be cleared by means of drain-rods, without having to open the ground or cut a single pipe. This is a great advantage, particularly in cases where the gradients are insufficient to render the drains self-cleansing. Manholes containing intercepting traps are usually known as intercepting chambers, and those receiving branch drains as junction chambers. A third class includes manholes placed in drains at changes of direction or of gradient. Access chambers ought also to be provided at each end of a drain passing under a building. In long outfall drains manholes and lampholes may be placed alternately at intervals of about 80 yards.

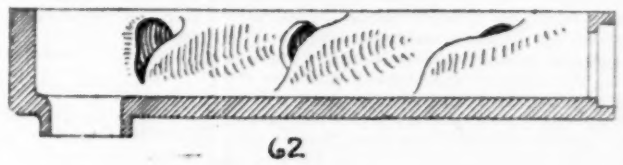
The Model By-laws are strangely silent as regards the construction of access chambers. The only provisions they contain relate to the nature of the cover. The London by-laws, however, require every means of access to drains "to be constructed so as to be water-tight up to the level of the adjoining ground surface or roadway, and to be fitted with a suitable manhole cover, and, if placed within a building, to be fitted with an airtight cover."

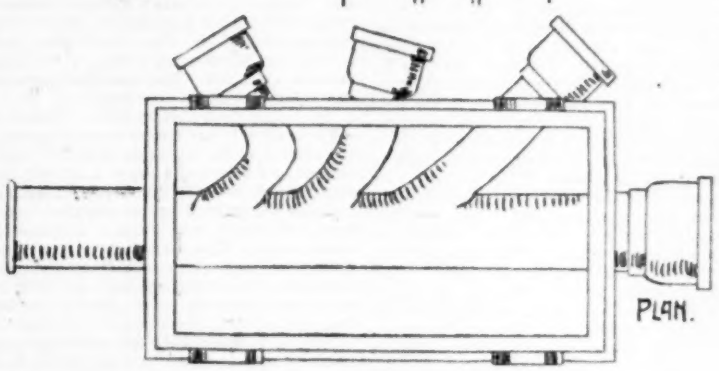
The length and breadth of the chamber must be regulated by the depth, the presence or absence of side branches, and (in the upper part) by the size of the cover. If the bottom is formed with open channels, the chamber ought to be as small as possible consistent with the insertion of clearing rods (usually made in lengths of 3 ft.) into the several drains; large volumes of air in the manholes render the ventilation of the drains more difficult. As drain-rods are flexible, they can be used in chambers less than 3 ft. in length or breadth, especially if "chutes" are fixed to form the ends of the drains. If there are no side branches, such a chamber may be about 2 ft. long and 1 ft. 6 in. wide inside. Chambers between 1 ft. 6 in. and 2 ft. 6 in. in depth must be

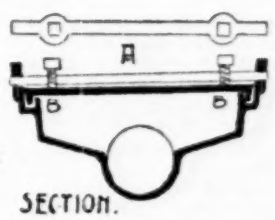


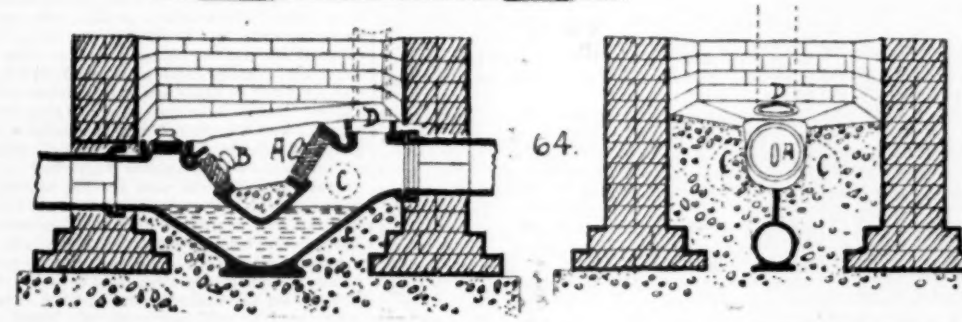


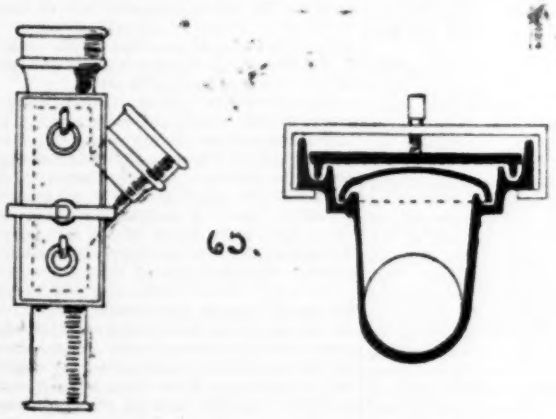


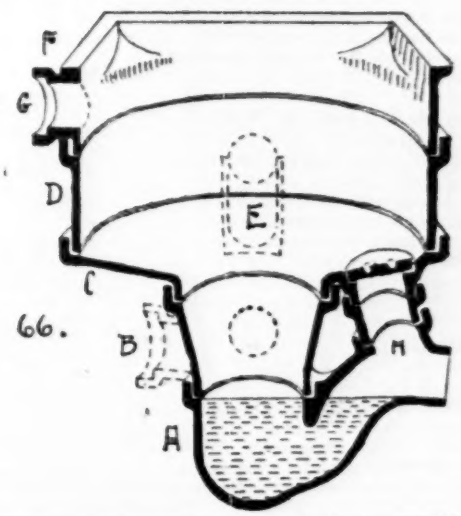












Illustrations to Student's Column.

increased in size to about 2 ft. 6 in. by 2 ft., or, if there are side branches, to 2 ft. 6 in. square. Deeper chambers must be larger, but need not exceed 3 ft. 6 in. by 2 ft. 6 in., unless the number of side branches necessitates a greater length. Covers of almost any dimensions are now made up to 3 ft. by 2 ft., and even larger. In the case of manholes more than 6 ft. deep large covers are unnecessary; all that is required is a cover with an opening large enough for a man to get through, say from 1 ft. 6 in. to 2 ft. square, or 1 ft. 6 in. wide and 1 ft. 9 in. or 2 ft. long.

The general construction of a deep manhole is shown in fig. 59. The foundation is of concrete, and the walls of 9-in. brickwork in Portland cement mortar (1 cement to 1 sand), all the joints well flushed and pointed, and grouted every course with neat cement. The bricks may be of any hard and sound variety, but for good work blue Staffordshire bricks, or salt-glazed or white enamelled bricks, may be used. Every one who has had any experience knows the difficulty of getting the ordinary workman to make 9-in. brickwork absolutely watertight, and it is sometimes necessary to rake out the joints and repoint them, or to render the brickwork with cement mortar. Sometimes the walls are entirely surrounded with concrete not less than 6 in. thick. The upper part of a deep manhole must be gathered over by means of a flagstone, as shown at A, or a brick arch, and may be further contracted above this to the size of the cover by means of oversailing courses. At one time it was a common practice to finish manholes with flagstone covers about a foot below the finished surface of the ground, but as this method of construction renders access more difficult, it cannot be recommended.

Manhole bottoms are sometimes constructed entirely of concrete with channels for the main and branch drains formed in the material, the whole covered with cement mortar (1 to 1) and trowelled to a smooth surface. It is much better, however, to use channels of the same materials as the drains. The simplest form is semicircular in section, the main channel

having curved junctions to receive the side channels from branch drains. Fig. 60 shows a manhole bottom with a number of branches entering the manhole at various angles, but so arranged that the flow in every branch is turned by the channel in the direction of the main flow. The spaces between the channels must be filled with concrete, which must be formed with quick slopes from the walls to the channels, and be trowelled to a smooth surface. The construction is often simplified by placing the side channels above the main channel; this arrangement is advantageous in preventing the sewage in the main from flowing into the branches, but may cause a considerable amount of splashing unless the side channels are specially designed. To prevent splashing, the outer edge of each side channel may be curved over so that the section becomes approximately three-fourths of a circle. A more elaborate type is Jones & Sykes's patent channel-bend shown in fig. 61, the branch-piece taking the form of a pipe with a hole in the top to admit a drain-plug or drain-rods, and with the discharging end curved slightly downwards so as to deflect the sewage more completely into the main channel. Manhole channels in connexion with stoneware drains are, for ordinary work, usually made of stoneware, but for the best work white enamelled ware is often preferred.

Manhole bottoms are now made in single blocks of stoneware or enamelled ware with main and branch channels of the required size and number. They are heavy and costly, but the absence of joints is a distinct advantage. An example is given in fig. 62. It is made by Twyfords in sizes up to 7 ft. by 3 ft., and for pipes up to 9 in. in diameter.

Iron channels, either coated with Angus Smith's solution or enamelled, are made for use with iron drain-pipes. Price's patent "Imperial" cast-iron manhole bottoms are a new departure. Each bottom consists of a single casting 1 ft. 6 in. wide, the length varying from 1 ft. 6 in. to 6 ft., according to the number of side branches. Fig. 63 is a plan of a bottom with three branches on one side. Special air-tight covers are also made to fit immediately over the bottom, one of these being shown at A; the cover is fixed by malleable iron bars and gun-metal screws, and the grooves at B B are made airtight with Russian tallow or other composition. The air-inlet to the drain is carried to the space between the cover and the bottom; this arrangement reduces the volume of air to be moved in ventilating the drain. These bottoms are too narrow to allow a workman to insert rods into the branch-drains, but more space can be provided in the manhole by forming offsets 4½ in. wide in the brick sides at or near the level of the crowns of the branch-pipes. The largest bottom has seven branches on each side.

When open channels are used, the flow of the sewage can be observed after simply removing the manhole cover, and the drains can easily be tested and cleared. The large volume of air in contact with the sewage is, however, a disadvantage, as it renders ventilation more difficult, and the splashing of sewage on to the "benchings" may give rise to a nuisance. For these reasons, pipes or traps with access covers are now sometimes used instead of channels. Fig. 64 is a section of an intercepting chamber of this kind, fitted with Sykes's patent interceptor. To inspect the inlet drain, the cap A must be removed, and the outlet drain can be inspected by removing the cap B. Sockets for branch drains can be provided in the interceptor as shown at C C, and a socket for the fresh-air inlet is formed at D. Stoneware access-pipes suitable for manholes have already been illustrated.

A cast-iron access-pipe, known as Jones's patent double-seal airtight inspection chamber, is shown in plan and section in fig. 65. The example illustrated has one branch socket, but the chambers can be made with any number of branches up to four. The upper seal formed by the cover and the grooves in the frame can be made airtight with Russian tallow or other composition, while the groove of the lower seal is filled with water and is kept charged by the condensed moisture on the arched plate running down into the groove. These access-pipes are, of course, adapted for iron drains carried on supports in the basements of buildings, as well as for use in manholes.

Small access-chambers are sometimes constructed entirely of stoneware. Fig. 66 gives some details of the "Accomo" intercepting-chamber, which is of this class. The trap A is made with 4-in. or 6-in. outlet, and above this is a "middle piece," which can be made with inlet sockets as shown by the dotted lines. The chamber floor C is 2 ft. in diameter and 6 in. high, and has a sloping bottom; above this a "raising piece" D is shown, and this also can be fitted with inlet sockets from which channels E lead to the central outlet in the chamber bottom. The top piece F is converted to a square shape, and has an air inlet socket at G. An inspection arm can be fitted to the trap as shown at H, finished with a socket and cap in the chamber bottom.

Steps ought to be built into the walls of deep manholes; they are generally of cast-iron of horseshoe shape, and spaced at vertical intervals of about 1 ft., or four courses of brickwork. They are supplied plain, coated, or galvanised.

GENERAL BUILDING NEWS.

A MEMORIAL CHURCH, THORPE, NORWICH.—On Easter Monday the new Primitive Methodist church at Norwich, which will perpetuate the memory of the late Mr. Jonathan Scott, was dedicated to the uses of public worship. The building is Gothic in style, and is built throughout of red brick, with Ancaster stone for the front and Costessey ware for the side dressings. The main entry is by way of a vestibule fronted by three granite columns and surmounted by three windows. On either side of the principal doorway is a fireproof staircase giving access to the gallery, a convenience which is also repeated at the southern end, so that there is a gallery exit at all four corners of the building. At the southern end also there are vestries, cloakroom, and lavatories, and a young people's institute. The seating accommodation is 650 for the church and 120 for the institute. The floor has been given a fall of 9 in. in the direction of the pulpit. The rostrum, the galleries, and the benches are all of oak. At the south end is an apse, the arch of which rests on granite columns, as do the side galleries. The builders were Messrs. Scarles Bros.; Messrs. Boyle carried out the ventilation work; and the electric lighting and the heating apparatus have been installed by Messrs. Payne. The cost of the site was 1,000*l.*, and the tender for the work at present completed was let for 4,300*l.* The architect was Mr. A. F. Scott.

PROPOSED CHURCH, KIRKCALDY.—It is proposed to erect on the tennis grounds at Victoria-road, Kirkcaldy, a new church for the U.F. congregation. The building is in the Renaissance style, and will contain 750 sittings and a gallery. The main entrance is flanked by two inner vestibules fitted as cloak-rooms, the galleries being reached by stairs leading from the corners of the main entrance. There will be a chancel at the rear of the pulpit in which provision is made for an organ. The lighting throughout will be by electricity. Under the church will be a set of halls, the larger hall having accommodation for 350, and the smaller hall being seated for 80. Mr. William Dow, Kirkcaldy, is architect for the work.

CHURCH OF ST. COLUMBA, BRADFORD.—On the 1st. inst. the Bishop of Ripon consecrated the new Church of St. Columba, St. Margaret's-road, Horton, Bradford, which has been built by Lady Powell at a cost of about 10,000*l.* The architects of the building were Messrs. T. H. and F. Healey. Within is a main nave, with north and south aisles, and quasi-transepts, with chancel flanked by a chapel and the organ-chamber. The church is not correctly oriented owing to the difficulties of the site. Space is found for the parish-rooms beneath the building owing to the drop in the ground. The nave is of six bays, with pillars alternately octagonal and circular. The clearstory is continuous throughout the nave and chancel, and is lighted by coupled lancets, and the roof is of unstained wood. The chancel is of three bays, subdivided into cusped arches, with slender octagonal shafts, the tympanum of the main arches bearing sculptured medallions, in high relief, of angels—the work of Mr. Hammond, of Messrs. Farmer & Brindley, London. The building will seat 700 persons, the pews being pitch-pine, whilst the choir-stalls, altar rails, and pulpit are of oak. The font is of stone and octagonal, supported with angle shafts. The organ is being built by Messrs. Harrison & Harrison, of Durham, and the altar frontal has been worked by the Ripon Diocesan Needlework Guild. The principal contractors for the building were:—Masons' work, Mr. Wm. Farnish, and joiners', Messrs. J. Taylor & Sons. The stone is from the Ringby Collieries, Halifax.

ST. PATRICK'S NEW CATHOLIC CHURCH, GORTIN, CO. TYRONE.—The plans of this building were prepared by the architect, Mr. Toye, of Derry, and the structure is being erected by Mr. D. Funston, Ballyshannon. The church is now finished inside. The high altar and altar rail, all in oak and walnut, were supplied by Messrs. T. R. Scott & Co., Dublin. The seats are being built by Mr. D. M'Caffrey, Lifford and Strabane.

ST. MARTIN'S EPISCOPAL CHURCH, POLMADIE, RENFREW.—This church, built in 1887 as a mission from St. Ninian's, Pollokshaws-road, is to be enlarged. This will be done by lengthening the nave and by the addition of a south aisle and transept next Dixon-road. A hall, with vestries and other rooms, will also be erected from the designs of Mr. H. D. Walton, architect, Glasgow.

CATHOLIC CHURCH, ACTON.—Cardinal Vaughan, on the 5th inst., laid the foundation-stone of a new Roman Catholic church, dedicated to Our Lady of Lourdes, in the Uxbridge-road, Acton. The church is to cost 5,000*l.*, and will be completed in July, the architect being Mr. Goldie.

HALL, ENZIE U.F. CHURCH, ABERDEEN.—On the 28th ult., the hall erected by the congregation of the Enzie United Free Church was opened, and dedicated by Principal Salmond. The frontage of the hall, which is to Main-street, is Gothic in style, the walls being of rock-faced ashlar. The building is surmounted by a belfry and bell, with a three-light window in the gable underneath. On the left of the vestibule is a small cloak-room, and the gallery stairway to the right, with two doors opening into the aisles, which run up both sides of the main building. The hall is seated for 300 and is 51 ft. by 31 ft. The two stained glass windows in the north gable on either side of the pulpit, are the work of Mr. Edward Copland, glass-stainer, Aberdeen. A 13 ft. by 20 ft. side hall, entered by a passage on the left, is to be used for smaller meetings; and adjoining this room there is a vestry, with lavatory. The contractors were:—Builder, Mr. Legge, Fochabers; joiners, Messrs. Hendry Bros., Portgordon; plasterer, Mr. R. Reid, Portgordon; slater, Mr. Barclay, Buckie; painter and glazier, Mr. Macdonald, Portsoy; and plumber, Mr. Campbell, Buckie. The architects were Messrs. D. and J. R. Macmillan, Aberdeen.

NEW INFANTRY BARRACKS AT PEMBROKE DOCK.—The new infantry barracks at Pembroke Dock are intended for the accommodation of the non-commissioned officers and men, and will, when complete, form two H-shaped blocks, the sides of the H in all cases being fitted up as sleeping quarters, each room of which will contain accommodation for twelve men. The connecting piece across the middle of each block will form dining-rooms and kitchens. The buildings will all have two floors, and a verandah will be constructed around them at the level of the upper floor. In addition to these blocks, a commanding officer's residence, officers' quarters, officers' mess, stables, gymnasium, &c., are to be built. The erection of the entire group is to be completed by December 31, 1904. It is to be carried out in three sections. The first of these, which includes one block of the men's quarters and a portion of the other, was entrusted to Mr. D. Davies, Cardiff, the contract price being upwards of 39,000*l.*, and it is now being proceeded with. The plans, particulars of quantities, and all other necessary information to enable competing builders to prepare estimates of cost for the second section have now been completed, and tenders for its erection will be invited shortly. The commanding officer's residence, officers' quarters, and officers' mess and stables are included in this section, of which the estimated cost is said to be 88,000*l.* The gymnasium and some other buildings, of which the plans are not yet approved, will form the third section. All the buildings will be of brick. Other military buildings to be carried out at Pembroke during the financial year include the construction of fortifications and artillery ranges, for which a sum of 4,800*l.* is proposed to be voted.

NURSES' HOME, ASTON, BIRMINGHAM.—The new nurses' home which has been erected at Gravelly Hill in connexion with the Aston Union Workhouse was opened on the 3rd inst. The building has been built from plans prepared by Messrs. C. Whitwell & Son, of Birmingham, by Mr. T. Johnson, builder, at a cost of 9,900*l.* It occupies a position facing Fellham-road, to the south of the Infirmary buildings. Accommodation is provided for upwards of forty nurses. On the ground floor the eastern end is given over to the rooms that will be occupied by the medical officer and steward, and to the west of the entrance-hall there is the superintendent nurse's room, and the rooms of the other nurses and probationers, with the usual rooms for meals, kitchens, &c. On the first floor there is the sleeping accommodation for the medical officer and steward, and bedrooms for forty-two nurses are on the top floor. The heating is by hot-water radiators.

BUILDING IN YORK.—The building inspector for the Corporation reports that on the west side of the city the building trade has in 1901 been brisk, though, compared with 1900, there is a decrease in the number of houses completed and in progress. This decrease has been somewhat balanced by the number of extensive additions to existing buildings. The greater number of houses erected are in the South Bank and Nunthorpe estates, Poppleton-road, Lindley-street, and Murray-street. On the east side of the city 218 houses, mostly of the small and middle class, have been built on the Hull-road, Lawrence-street, Church Park, Huntington-road, and Burton-lane estates. Extensive new public buildings and additions and alterations to existing premises are in progress.

BUSINESS PREMISES, PRINCES-STREET, EDINBURGH.—An addition has just been made to the business premises of Princes-street by the erection of the building at No. 136, which is to be occupied by Messrs. Macvittie, Guest, & Co., Ltd., bakers and confectioners, as the headquarters of their city

business. Designed by Messrs. Hamilton, Paterson, & Rhind, architects, the building has a frontage of 30 ft. to Princes-street, and is 80 ft. in height, divided into four principal floors. The walls are of sandstone ashlar, except the whole of the shop front, which has been faced with polished red Correnie granite.

URBAN DISTRICT COUNCIL OFFICES, HEATON NORRIS, LANCASHIRE.—The new offices of the Heaton Norris District Council are situate at the corner of Thornfield-road and Green-lane. The new offices are of stone construction, having Yorkshire parpoint facings with Alderley stone dressings, the roof being covered with Tilberthwaite green slates. This main front has a predominating projecting central portion flanked by two wings. Approached by a short flight of steps flanked with sweeping balustrades on either side is the principal entrance. This leads to a vestibule decorated in faïence, tiles, and mosaics. A few steps from the vestibule give access to the ground-floor corridor, the main staircase to the first floor being central, and immediately facing the principal entrance. Entered from the main corridor on the ground floor are the administrative offices. Those of the collector and surveyor are on either side of the principal entrance. Communicating respectively with these, as well as directly from the corridor, are the clerk's general and the surveyor's general offices. The clerk's private office opens off the corridor and communicates also with the clerk's general. Also on the ground floor in the rear of the building are provided an overseer's and sanitary inspector's offices, as well as additional rooms available as spare offices, waiting-rooms, &c. At the end of the two passages on either side of the principal stairs a telephone-room and ante to the back entrance are respectively provided. The first floor is reached by means of stairs (18 ft. wide) of oak and pitch pine. On the first floor is a corridor (8 ft. wide), and directly approached from this is the Council Chamber occupying the entire central part of the front of the building. It is a room nearly 40 ft. long by 20 ft. wide and 16 ft. in height. Opening off the Council Chamber, as well as directly from the corridor, are the Council retiring-room and committee-room. The former occupies the entire left wing of the building from front to back. This room is divisible into two, when desirable, by a patent folding screen. Its dimensions are:—Length, 41 ft.; width, 21 ft.; and height, 13 ft. There are also two waiting-rooms, a stationery store, lavatories, &c., on this level. The basement is approached under the main stairs on the ground floor; this is devoted to heating and other purposes. The architects are Messrs. Woodhouse & Willoughby, who won the first premium in the limited competition held some five years ago, amongst nine competitors. The general contractors were Messrs. A. R. Bullivant & Sons, of Manchester and Moston. Mr. Samuel Mellor was clerk of works. The following tradesmen have been engaged on the work, apart from the general contractors, viz.:—Heating and ventilation, Mr. E. Hatton, Manchester; mosaic flooring, Messrs. Patteson, Manchester; art metal work, Mr. A. Standring, Manchester; sanitary fittings, Messrs. Shanks, Manchester; ironmongery, locks, &c., Messrs. Marley Bros., Birmingham; wood block floors, Mr. E. P. Garth, Manchester; grates and mantles, Messrs. C. W. Williams & Co., Manchester; stained glass windows, Mr. S. H. Leyland, Weaste; gas fittings, Messrs. Baxendale, Manchester; patent folding partitions, Messrs. Peace and Norquoy, Manchester; fireproof door to strong room, Messrs. John Port & Co., Ancoats, Manchester; carving, Mr. J. J. Millson, Manchester. The silver-gilt presentation key has been supplied by Messrs. Marley Bros., Birmingham. A brass tablet has been erected in commemoration of the opening of the offices. It is about 3 ft. long and 2 ft. in width. The tablet consists entirely of brass mounted on highly polished black marble, the work of Messrs. Thomas Webb & Co., Stockport.

PUBLIC OFFICES, BIRKENHEAD.—At Birkenhead, on the 3rd inst., Mr. John Evans, Chairman of the Board of Guardians, laid the foundation-stone of the new Union Offices in the course of erection on a plot of land off Argyle-street. The new offices have a frontage of 59 ft. to Argyle-street, 176 ft. to Conway-street, and 100 ft. to Oliver-street. The building, which is three-story, will be constructed in Ruabon red brick with terra-cotta dressings with Crowdundale stone. The angle at the corner of Argyle-street and Conway-street is octagonal, and at the head of the building at this point is an ornamented turret with a dome. The main entrance is from Argyle-street, and the entrance for relief applicants in Oliver-street. The main porch is recessed, with a moulded arch of terra-cotta and red stone intermixed. Immediately inside the main entrance is the main staircase, at either side of which will be granite columns and arches in Crowdundale stone. Over the staircase will be a dome, through which light will be obtained for the main entrance hall. The departments in the basement are utilised principally for storing purposes. On the ground floor are the general offices, clerks' offices, marriage-room, conference-offices, relieving-rooms, doctors'-rooms, dispensary, and a waiting-hall 56 ft. by 46 ft. The board-room, which is 52 ft. by 36 ft., is on the first floor, and on the same floor are the general committee-room, assessment-room, extra committee-room, consulting-rooms, lavatories, and cloakrooms; a corridor gives access to each of these rooms. On the second floor are the valuer's private office, the vaccination office, book store, and extra committee-rooms, while at the rear of this floor is the caretaker's residence. The third floor is utilised for domestic purposes. The building is lighted throughout by electricity. The architect for the building was Mr. Edmund Kirby, the contractor Mr. W. H. Forde, and the clerk of works Mr. W. Hughes.

NEW BUILDINGS IN ABERDEEN.—At a meeting of the Plans Committee of Aberdeen Town Council on the 3rd inst., seventeen sets of plans of buildings were submitted, the aggregate value of the property represented being 17,400*l*. The plans include those of small additions to Morningfield Hospital for Incurables and to the Educational Trust's Schools in King-street; a new business building for the Seaton Brick and Tile Company, on the site of their present sheds in Market-street; and a number of new dwelling-houses in different parts of the city.

CHURCH HALL, READING.—A new church hall has been erected at Reading. The hall is built of red brick, and is lighted by three large windows. The flooring is of wood blocks. The architect is Mr. W. Jane.

CORONER'S COURT, BATTERSEA.—On the 5th inst. the Mayor of Battersea performed the opening ceremony in connexion with a new coroner's court and mortuary which the Borough Council has erected at Sheepcote-lane, Latchmere-road. The new buildings have a frontage of 55 ft. and an average depth of 82 ft. On the ground floor are the coroner's room, doctor's and attendants' room, post-mortem room, mortuaries for infectious and non-infectious cases, and storerooms. The first floor comprises an open-timbered roof court and witnesses' rooms. The buildings have been erected under the supervision of, and from designs prepared by, Mr. J. T. Pilditch, the Borough Surveyor. The approximate cost of the buildings has been about 5,000*l*.

CLOCK TOWER, SALTBURN-BY-THE-SEA.—A new memorial clock-tower has been erected at Saltburn-on-the-Sea, as a memorial to the Rev. B. Irvin, the vicar. The tower is from the design of Messrs. Clark & Moscrop, architects, of Darlington, and the clock and chimes are by Messrs. Potts & Son, of Leeds. The builder is Mr. R. Harland, of Whitby.

HOSPITAL EXTENSION, BURNLEY, LANCASHIRE.—A new operating theatre at the Burnley Victoria Hospital was opened on the 26th ult. The new theatre has cost 1,000*l*. The work has been carried out by Mr. Quarmby, architect and surveyor, Burnley.

PROPOSED NEW THEATRE, BURTON-ON-TRENT.—It is proposed to erect a new theatre at Burton. A site has been obtained in a central position, the main frontage being in Cross-street, with side entrances in Duke-street and the stage entrance in Milton-street. The site covers an area of 1,400 sq. yds., and on this it is proposed to erect a theatre capable of accommodating 1,200. The pit and stalls are to provide for half that number, with a dress-circle and gallery accommodating 300 each. The stage is to measure 36 ft. by 60 ft., the proscenium opening being 30 ft. across. The building is expected to cost about 15,000*l*. Mr. E. Forshaw is the architect.

BUSINESS PREMISES, LIVERPOOL.—Messrs. Jacobs, the Liverpool firm of tailors and outfitters, have just opened new premises, erected at the corner of Ranelagh-street and Lime-street. The site has a frontage to Ranelagh-street of about 65 ft., running in depth to Mitchell-place, Back Lime-street, for about 80 ft. The new building consists of six floors (including basement), finishing on the roof with a gilded tower and turret, for illumination purposes, rising to a height of 120 ft from the pavement. The work has been carried out by Messrs. H. E. B. Greene & Co., the contractors, under the superintendence of Messrs. W. Hesketh & Co., the architects. The electric lighting is being carried out by the Liverpool Corporation under the superintendence of their Deputy Electrical Engineer, Mr. Alfred Clough.

STAINED GLASS AND DECORATION.

QUEEN VICTORIA MEMORIAL WINDOW, ST. BARTHOLOMEW'S CHURCH, BRISTOL.—On the 5th inst. the stained-glass window placed in St. Bartholomew's Church, Bristol, as a memorial to the late Queen Victoria, was unveiled and dedicated by Canon Everingham. The window consists of five lights and tracery. The lights are divided into three separate groups. The principal subject, which is contained in the three centre lights, is "The Ascension." Beneath the figure of our Lord are grouped in various attitudes the eleven Apostles, and on either side are angels kneeling in adoration. In the left-hand light the subject is "The Nativity." The right-hand light depicts "The Resurrection." In the tracery of the window above are emblems of the four Evangelists, and two large figures of kneeling angels, bearing scrolls. The work was carried out by Messrs J. Bell & Sons, of Bristol.

WINDOW, PARISH CHURCH, RAMSGATE.—On the 5th inst there was unveiled at the parish church of St. Laurence, Ramsgate, a stained-glass east window erected as a memorial of Queen Victoria, who, as a girl, worshipped there. The window, which is from a design by Mr. A. O. Hemming, depicts in its central panels the Resurrection, the subjects treated in the lower lights being scenes in the early history of the Church in Britain, including the landing of St. Augustine in A.D. 597, and the baptism of King Ethelbert at St. Martin's, Canterbury.

WINDOW, LEEK PARISH CHURCH, STAFFORDSHIRE.—A new painted glass window has been put into the old Parish Church, Leek. The figures are all, with the exception of the four angels holding the scroll (in the tracery), designed by the late Sir E. Burne-Jones, and the exceptions were designed by the late William Morris. The window has been executed by Messrs. Morris & Co., at a cost of about 500*l*.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Mr. C. H. Brodie, architect, has removed his offices from 17 Southampton-street to 15 Hart-street, Bloomsbury, W.C.

VICTORIA STATUE, PORTSMOUTH.—A statue of the late Queen is to be erected near the Town Hall, as part of the Portsmouth Coronation commemoration. The sculptor is Mr. A. Drury.

OLD FONT RECOVERED.—The Rev. D. W. Duthie, rector of Caister-on-Sea, has applied to the Chancellor of Norwich for permission to place in his church an ancient font recently discovered by the rector of Mellis in a cottage garden near Eye, Suffolk. The font is of Decorated architecture, and probably fashioned in the sixteenth century. It had done duty as a big flower-pot, and weighed nearly a ton. Where it came from originally has not been discovered. Mr. Duthie proposes to remove the present small font in Caister Church to a chapel-of-ease to make way for the older one.

PEABODY BUILDINGS, HERNE HILL.—The Governors of the Peabody Donation Fund have just carried out a scheme for the housing of London workers of the poorer class. They have acquired an area twenty acres in extent at Herne Hill, and on a portion of this land, representing about eight acres altogether, they have constructed in four groups, and at a total cost of 70,000*l*., twelve blocks of artisans' dwellings, of which three are now ready for occupation. There is room on the eight acres, it is stated, for a total of forty-eight blocks, but only the twelve in question have been erected at present. The dwellings are in Rosendale-road, Norwood-road, within two minutes' walk of Brockwell Park; each of the twelve blocks consists of nineteen tenements—three of one room each, eleven of two rooms each, and five of three rooms each—a total of forty rooms per block. A single-room tenement is available for husband and wife and one child under five years; a two-room tenement for husband, wife, and four children under twelve; and a three-room tenement for husband, wife, and six children under twelve. On this basis the twelve blocks can accommodate 1,380 persons without overcrowding; while the whole forty-eight blocks which could be put upon the eight acres (allowing a space of 60 ft. between the various groups of buildings) would lodge 5,520. Unless in exceptional circumstances no tenants are accepted whose earnings exceed 30*s.* a week, the actual average being 22*s.* Each of the two-room and three-room tenements has not only a cooking-range or kitchener, with boiler and oven, but is also supplied with a gas-stove, which may be used or not, as the tenant pleases, the gas being obtained by means of a penny-in-the-slot meter fixed against the wall. The single rooms have the cooking-range without the gas-stove, but a gas-pipe is fixed, so that the tenant may easily make his own arrangements for cooking by gas if he so desires. Every tenement, too, is provided with cupboards, meat-safe, coal-bunker, and gas-fittings. On the top floor of each block there is a laundry and drying-room. The rents charged for the new dwellings are—for one room, 2*s.* 9*d.* per week; for two rooms, 5*s.* 3*d.* per week; for three rooms, 6*s.* 6*d.* per week. But these various sums do not include the rates, which will have to be paid by the tenants themselves.

LONDON GEOLOGICAL FIELD CLASS.—The series of Saturday afternoon excursions of the London Geological Field Class, conducted by Professor H. G. Seeley, F.R.S., will commence on the 26th inst., when a visit will be paid to Erith; and the excursions will be continued on each succeeding Saturday (except on Saturdays before Whitsuntide and in Coronation week) until July 12. Further particulars can be obtained from the Hon. Gen. Sec., Mr. R. Herbert Bentley, 43, Gloucester-road, Brownswood Park, N.

EUSTON HALL, SUFFOLK.—Euston Hall, near Thetford, a seat of the Duke of Grafton, has been greatly injured by a fire that broke out in the forenoon of Saturday last. The flames were discovered in the west wing whence they spread to the south-west front. The north wing, together with the valuable collection of pictures, has been saved, but the west front, including the dinner-room, famed for its painted ceiling, and the south wing are consumed. Euston Hall, built of red brick with stone dressings, stands in a finely-planted park, extending over 1,250 acres, watered by the Thet, which is crossed by a wooden bridge that carries the road from the west. It was originally built *temp.* Charles II. for Henry, Earl of Arlington, whose daughter and sole heir, Isabella, married the first

Duke of Grafton. Amongst the pictures are portraits of James I. and his Queen, by Jansen; Charles I. with the Marquis of Hamilton, by Van Dyck; James II. and Anne Hyde, by Lely; and Henry, first Duke of Grafton, by Kneller.

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-carving, South Kensington, has been re-opened after the usual Easter vacation, in rooms on the top floor of the new building of the Royal School of Art Needlework in Exhibition-road, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the Technical Education Board of the London County Council and by the Draper's Company are vacant. The evening class has been re-opened and will meet on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

CAPITAL AND LABOUR.

BRADFORD JOINERS' STRIKE.—The dispute in the Bradford building trade still drags on, and during the past month 300 joiners, now the only operatives holding out, received strike pay. An offer by the masters to pay 8½d. per hour, with the concession that notices of alteration of rules should expire on June 30 instead of May 1, has been rejected by the Amalgamated Society of Carpenters and Joiners by 350 votes to 70. The Mayor's proposal, however, that a Conciliation Board be formed, with a view to settling the differences and insuring future industrial peace, has been willingly agreed to.

STRIKE IN THE KIDDERMINSTER BUILDING TRADE.—A general strike has occurred among the bricklayers of the Kidderminster district owing to the employers refusing to grant an advance of 1d. an hour to the men from April 1. Some other questions have been raised, but the principal point at issue is that of wages. All the labourers are thrown out in consequence of the strike.

LEGAL.

EMPLOYERS' LIABILITY ACT: QUESTION AS TO "DEFECTIVE" FLOOR NEAR A SAW-BENCH.

AT the Brompton County Court on Monday, before Deputy Judge Clement Lloyd and a jury, George Baker, a builder's machinist, Hampstead, N.W., brought an action, under the Employers' Liability Act, against Mr. William Willett, builder, Chelsea, S.W., claiming damages in respect of personal injuries sustained, and said to have resulted from a defect in the defendant's machinery or "works and ways," or negligence on the part of the defendant or his servants.

Mr. H. J. Turrell, counsel, appeared for the plaintiff; and Mr. J. R. Atkin, counsel, defended.

Plaintiff's counsel explained that his client entered the defendant's employment in January last as a machinist. On February 4 he was cutting pieces of wood for sash-frames by means of a circular saw. It appeared that close to where the man was standing there was a trap-door in the floor, and that while his left foot was upon the trap-door the latter shifted an inch or so, causing him to slip and get his left hand in contact with the saw. Subsequently, the middle finger had to be amputated, and the first and third fingers also were badly injured. Owing to the accident the plaintiff had since been unable to do any work, and would not, it was said, be able to continue work as a machinist in the future.

The plaintiff bore out his counsel's opening statement. He added that prior to the date of the accident his work at the defendant's shop had been to attend to an "over-hand joiner" and a "general joiner." At the time of the accident, however, he was cutting "pocket pieces" in the sash-frames, under the foreman's directions, on a simple circular-saw bench. He complained about the "fence" on this machine not extending beyond the side of the saw, and the foreman replied, "No, it's no good; I am going to have a new one put in. Do the best you can with it at present." Subsequently to the accident he (plaintiff) went to the shop and found that the trap-door could be shifted 2⅜ in. by one's foot and as much as 8½ in. by hand.

Cross-examined: The object of the "fence" at the side and extending above the circular saw was not to protect the workman.

The foreman of the jury: It is a guide.

Mr. Atkin: That is so; the term "fence" is ambiguous, and in this instance, perhaps, a little misleading.

In answer to further questions, the plaintiff denied having admitted that the occurence was a "pure accident," or that he, and not the trap-door, slipped. It was true that in the shop there was a notice to the effect that all persons employed on the works were required to give immediate information of any negligence on the part of those in authority, or of the existence of any defect in the machinery or plant.

Re-examined: He did not know of any defect in the trap-door prior to the accident. He understood that it was no part of his duty as a machinist to inspect the floor round the machine which he was instructed to work.

Mr. H. Burrows, F.R.C.S., &c., described the man's injuries.

George W. Dixon, a foreman builder's machinist, stated that he examined the trap-door in question shortly after the accident, and found that it shifted as the plaintiff had described. Witness also maintained that the "fence" ought to have extended beyond each side of the circular saw, and that the "fence" on the machine was too short for the work in question.

Ernest Jones, a builder, gave similar evidence as to the trap-door being easily shifted.

For the defence, Arthur Moore, shop foreman to the defendants, said that the trap-door had been formed in order to facilitate the finding of nuts or small portions of the machine which might drop down. Witness knew, of course, that the trap-door would "take up," but he was not aware that it would slip when stood upon. The plaintiff had never complained to him about the trap-door. Witness went on to state that the plaintiff admitted that the occurrence was a "pure accident," and that he slipped, but the man said nothing about the trap-door slipping.

Cross-examined: The trap-door could be moved about an inch and a half without difficulty when the sawdust and chips were cleared away. It was necessary for a man working the machine to have a firm foothold.

Arthur W. Edwards, another machinist in the defendant's employment, stated that he had worked the machine in question many times, and had never known the trap-door to slip.

Edward Edwards, brother of the last witness, and also a machinist in the defendant's employment, gave similar evidence.

The jury found in favour of the plaintiff, assessing the damages at 100*l.*

His Honour gave judgment accordingly, and allowed costs, including advice on evidence, particulars, the qualifying of two witnesses, and for the preparation of a plan of the *locus in quo*.

ISLINGTON DRAINAGE CASE.

THE case of Proctor *v.* the Mayor, &c. of Islington, came before Mr. Justice Wright in the King's Bench Division on the 9th inst. It was an action by the plaintiff to recover from the defendants 54*l.* as moneys paid to the use of the defendants and at their request. It seemed that in January, 1901, the defendant Council's Sanitary Inspector served the plaintiff with notice that certain drains on the plaintiff's premises in Rotherfield-street, Islington, were defective. The plaintiff thereupon engaged a builder to do the necessary work, thereby incurring expenses to the amount of 54*l.* The plaintiff's case was that the repairs which had to be done were repairs to a sewer which it was the duty of the defendants to maintain, and that she was therefore entitled to recover the costs she had been put to in doing such work as was required by the notice. The defendants admitted, for the purpose of deciding their liability under the notice, that the work done was work upon a sewer which it was their duty to maintain. Mr. Courthope-Munroe, however, on their behalf contended that the notice served on the plaintiff was an intimation that the drainage was defective, but the Council did not order the plaintiff to do the work in question, and that, therefore, the defendants were not liable.

Mr. Justice Wright, at the conclusion of the arguments, held that the plaintiff could not recover as she had not done the work under compulsion, or at such a time as the Council themselves were bound to do the work. He accordingly dismissed the action with costs.

Mr. Oliver represented the plaintiff.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

22,090.—APPARATUS FOR THE WELL GATES OF LIFTS: *A. Johanson.*—The upper horizontal bar of the gate is affixed to a shaft having two fixed pulleys that are joined with crossed and open belts to two pulleys upon a lower shaft. One of the latter runs loosely upon, and the other is secured to, the lower shaft. With the ascent of the cage a projection from it engages with an arm that extends from the fixed pulley, and by lifting it causes a shaft to turn, whereby the gate will be raised and collapsed. With the further lifting of the arm, another arm, extending from the loose pulley, drops upon the ascending cage into engagement with another projection, and so the gate is lowered again, the former arm being at the same time lowered to its starting position. The gate is locked by the engagement of a pin upon a sliding-arm with an arm upon a shaft, which will be unlocked again by a cam which forces away the sliding-arm when the cage has arrived at the landing.

22,105.—COMPOSITE PAVEMENT FOR STREETS: *A. C. W. Hobman.*—Limestone, granite, Kentish rag or some such hard stone, is broken up to a 2-in. ring gauge, coated with mineral oil, asphalt, tar, Trinidad pitch, &c., mixed with a flux, laid upon a foundation of concrete, or "hard core," and then rolled. After a grouting of pitch or asphalt has been run into the interstices, the pavement is again rolled.

22,119.—A CONTRIVANCE FOR USE WITH WINDOWS: *A. E. Wright.*—Compressed springs are adapted to balance and shut the upper sash, and similar springs, under tension, serve to shut the lower sash. The two sashes are fastened to upper blocks that are cast upon the ends of the springs with screws or pins which will slide through slotted casings. In order that the sashes may be turned inwards the beads are made detachable, bolts or pivots of the upper casings are set so as to slide in angular slots cut in fixed plates, and the lower casings are pivoted on to the bottom of the frame.

22,125.—A WATER-METER: *W. G. Kent.*—The movement of a spring or weigut which is regulated by a valve indicates the flow of water; a single flap or two-flap valve is pivoted to its seat about a line between the edge and the centre line; a cover is provided for the removal of the valve, and keys fasten it in grooves in the casing; a cord is passed about a quadrant on the valve and thence to the recording-mechanism; movable counter-weights, or a spring, will regulate the valve. For a reverse flow the main valve is fitted with a spring-controlled pivoted valve.

22,139.—SLABS, &c., OF ARTIFICIAL STONE: *L. Hatschek.*—An admixture of fibrous animal, mineral, or vegetable substances, with a diluted portion of hydraulic lime or Portland cement, of which the setting is delayed by adding unburned gypsum, &c., is put into a tank whence it is fed by means of a sieve-drum to the surface of an endless band which passes it between pressure-rollers, and thence on to a drum fitted with a pressure-roller. The plate thus fashioned is stripped from the drum and cut into suitable lengths for finishing purposes.

22,151.—JUNCTIONS FOR PIPES: *J. Elrick.*—The invention relates to junction pieces or eyes, which are available for use with pipes of clay, stoneware, brass, or cast-iron alike; a flange maintains the collar of the junction-piece in its place after it has been fitted on to the pipe.

22,155.—A CONTRIVANCE FOR USE WITH VENTILATORS AND WINDOWS: *E. McGloughlin and J. C. McGloughlin.*—With the closing of the window a spring presses upwards a catch, which is pivoted to the sash, into engagement with a slotted plate affixed to the frame. The opening of the sash is limited with a jointed stay, of which one link has a flanged stop. The catch may be pulled back with a ring or handle, or with a cord passed around guide-pulleys, and the frame has a recess into which the stay will be folded after the sash has been shut.

22,165.—BUILDING-BLOCKS AND BRICKS: *W. Cockburn.*—The blocks and bricks are fashioned out of terra-cotta, stone, &c., with stepped or rebated bedding surfaces, in order that the passing of moisture through solid or hollow walls may be prevented.

22,177.—A COVERING COMPOSITION FOR WALLS, CEILINGS, AND OTHER SURFACES: *D. M. Sutherland.*—A waterproofing compound, made up of an oxidised or solidified vegetable oil and wood-flour, whitening, &c., mixed when hot, is applied to sheets of asbestos or paper as they are fed through calender rollers, or through embossing rollers.

22,189.—A COMBINATION TOOL: *M. C. Jackson and J. McDonough.*—One part of the shank on which the movable jaw is formed slides, but does not turn, in the tubular portion of the fixed jaw: the other part, which is screw-threaded, engages with the tubular handle, which has a swivel-joint with the tubular part of the fixed jaw that is grooved for a collar to be fitted on from one side only and has a roughened thumb-piece so that the parts will not be turned in respect of one another as the tool is being used. The attachments for the tool render it available as a pipe-wrench, and for conversion into a vice; in the latter form there is an L-shaped piece whereof one part can be screwed on to a bench, whilst the other part serves for a jaw, the shank being inserted through an aperture in that piece.

22,227.—DEEP-BORING MACHINERY: *J. Vogt.*—A pulley, on a loop of the rope, carries the boring rods, the two ends of the rope are passed around two pulleys mounted in the overhead frame and around the first-named pulley, one end of the rope is led to the winding-drum, and its other end is passed around a pulley upon the rocking beam and so to its point of attachment.

22,228. — FASTENINGS FOR ROOFING: *E. G. Hutchings.*—Slates, tiles, &c., are fastened to the battens of a roof by means of metallic strips, which are pierced and grooved for the heads of nails, near their lower ends are punched screw-holes for screws to be inserted through washers and fitting into notches cut in the lower edges of the slates.

22,245.—APPLIANCES FOR LIFTING AND WINDING MACHINES: *W. R. Green.*—A shaft carries the drum, which is loosely mounted and driven with a clutch. The brake-sheave, loosely mounted, has pawls that will engage with the ratchet-wheel, which is affixed upon a boss. As the load is lifted the rotating drum is freed from the brake, but when the power is withdrawn the ratchet-wheel and the pawls become engaged, and thereby prevent a running-back of the load before the brake has been eased.

22,248.—AN INSTRUMENT FOR USE OF SURVEYORS AND OBSERVERS: *J. Waddell.*—The inventor seeks to provide means of ascertaining, by a single observation, the parallactical angle and there-

from the range or distance of an object; of the two telescopes one is fixed, the other can be turned about a vertical axis so that its own axis shall converge to intercept the axis of the other telescope upon any distant object, the angle through which the converging telescope is turned will measure off the range upon a scale. Provision is made for the taking of an observation with the two telescopes at any one time, their eye-pieces being mounted upon arms that have reflectors at the angles. A finder is fitted for the fixed telescope, and the other one is adjustably affixed to a ring that can oscillate about a pin in the frame. The scale may be graduated to indicate either the distance of the object directly or the angle subtended at the object by the base of the instrument. For surveying purposes the lower circle of the pillar is divided for the reading off of azimuth angles. The stay-rod is graduated to indicate the co-sine of the angle of elevation or depression, so that one may ascertain the horizontal distance of objects that are above or below the horizon, or with a scale of co-secants for determining the height of an object.

22,302-3.—COMPOSITE MATERIALS FOR WALLS, FLOORS, PARTITIONS, &C.: *E. H. Bell.*—A compound of wood-wool, sawdust, ground cork, asbestos waste, and infusorial earth is boiled in a jacketed receiver with a solution of distilled water, 45 parts, crystallised chloride of magnesium, 55 parts, and chloride of ammonia, 1½ parts; an upper or wearing surface consists of fine sawdust mixed with the magnesium compound and mineral colours ground in boiled linseed oil. The composition is specified as being available also for tiles or plates for covering walls, ceilings, and so on. (22,303.) Slabs having fine interlaced channels are made of a plastic admixture of clay, infusorial earth, and a solution of calcium chloride that contains 10 per cent. of sulphate of magnesia, wood-wool, and asbestos waste. The tiles are made of burned cellular earthenware plates cemented to plates fashioned out of cork waste or similar substances, and have recesses that take the projecting ends of metallic strips, or the strips may be replaced with sheets and bands of wire gauze.

22,305.—SLUICE GATES: *F. E. Whiting.*—The inventor combines two sliding sluice gates, and causes the water pressures upon them to almost neutralise one another, so that the resultant pressure shall effect a close joint at one or both of the gates, which are intended for waterways, the outlet tower of a reservoir, or the hollow counterfort of a reservoir dam. The gates are attached parallelwise to a middle open frame so as to control the inlets. The lintel of the side frame is put forward enough to permit the one gate, which is rather larger than the other, to move between it and the frame, the motion being similar to that of a piston, with roller or other packing.

22,314.—AN APPLIANCE FOR USE WITH LADDERS: *G. Meyer.*—A middle perforated channel bar, two pivoted arms, and double hooks that will engage with a round of the ladder, constitute a bracket for a table or shelf. One of the arms forms a stay which is pivoted to a pierced sliding plate to be locked within the channel bar. The lever which fastens the contrivance supports an eccentrical plate having stepped slits, and is locked with a pin or wedge over a lower round of the ladder.

22,315.—AN INSTRUMENT FOR USE BY DRAUGHTSMEN AND OTHERS: *V. Reiswitz.*—The instrument is devised for measuring the angle between two surfaces and for plotting angles upon paper. On one of its two arms is mounted a disc through a slot wherein is passed the clamping-screw for engagement with the other arm; the two arms are grooved for their extension-pieces, to one arm is pivoted a plate of which the head engages with a groove in the other arm covered with a graduated plate for indicating the angle at which the arms are opened.

22,404.—APPARATUS FOR WATER-SUPPLY SERVICE: *J. Croppi and L. Edant.*—The regulating-valve of the service-pipe is fitted with an auxiliary starting-valve. Upon the stem of a piston, which is pressed upwards with a spring within a chamber, is mounted a valve for regulating the passage from the inlet to the outlet. A time-cock is fitted on a passage placed in communication with the upper and lower sides of the piston. A valve, which a spring retains upon its seating, prevents, under normal conditions, any communication between two pipes which lead to the auxiliary valve, but when the former valve is opened (by means of the push on its stem) water from the chamber that contains the piston flows away through the pipes to the outlet, whereupon the valve on the piston-stem, being relieved from pressure, will open, and permit the flush to flow. At the release of the push the valve is shut, and water will flow into the chamber, and so shut the valve on the piston-stem again. Other modifications of the invention are specified.

22,527.—VENTILATION APPARATUS: *W. F. McGibbon.*—For ventilating a church or other building a flue is passed from the firing-chamber of a furnace in the basement to the ceiling or roof, or to cross-pipes and gratings through which foul air is abstracted. After the furnace has been fired-up for a strong draught, the firing-door and the door of the firing-chamber are shut, in order that the air which is needed for combustion shall be drawn only through the flue, and that foul air shall be drawn away too—the latter current being replaced with cool or heated air admitted through the ventilating gratings. The invention will, it is stated, facilitate circulation of heated air during the warming of the building by its heating apparatus.

22,537.—A ROAD SCARIFIER: *B. Asplen.*—The scarifier can be attached to a traction engine or a road roller, or be mounted upon a carriage. Its two rows of inclined adjustable tines are fastened with set screws in the slots of flanges at the ends of the inclined portions of the casing which slides within an outer casing, on the side walls of which are mounted carrying flanges. Pins retain buffer-springs that force the head of the inner casing against a washer upon an adjusting spindle, which is screw-threaded for engagement with a bush, and is flanged above the adjustable buffer-plate. A key-plug maintains the bush within its recess.

MEETINGS.

FRIDAY, APRIL 11.

Architectural Association.—1. Special meeting to consider some alterations and additions to the by-laws, 7 p.m. 2. Mr. W. D. Caröe on "The Preservation of Ancient Buildings," 7.30 p.m.

Royal Institution.—Professor Dewar, M.A., on "Problems of the Atmosphere," 9 p.m.

Glasgow Architectural Craftsmen's Society.—Mr. J. I. Little on "The Sewage Disposal of a Country House," 8 p.m.

Sheffield Society of Architects and Surveyors.—Annual meeting.

SATURDAY, APRIL 12.

Architectural Association.—Visit to the Eastern Telegraph Company's Offices, Finsbury Pavement, by permission of the architect, Mr. John Belcher, A.R.A., 2.30 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at the Sewage and Destructor Works, Ealing, 2.15 p.m.

MONDAY, APRIL 14.

Surveyors' Institution.—Mr. C. H. Hooper on "Compensation for Fruit Planting," 8 p.m.

Society of Arts (Cantor Lectures).—Mr. R. T. Glazebrook, M.A., on "Glass for Optical Instruments," I, 8 p.m.

Bristol Society of Architects.—Annual General Meeting: (1) Election of Council and Officers; (2) Mr. J. Atwood Slater on "A Continental Tour," 8 p.m.

Clerks of Works Association.—Twentieth annual meeting, Carpenters' Hall, 7.30.

TUESDAY, APRIL 15.

Institution of Civil Engineers.—Papers to be further discussed—"The Greenwich Footway-Tunnel," by Mr. W. C. Cooperthwaite; "Subaqueous Tunnelling through the Thames Gravel: Baker-street and Waterloo Railway," by Mr. A. H. Haigh, B.Sc.; and paper to be read "On Locomotive Fire-box Stays," by Mr. F. W. Webb, 8 p.m.

WEDNESDAY, APRIL 16.

British Archæological Association.—(1) Mr. Andrew Oliver on "Some Old London Views:" (2) Rev. J. A. Penney, M.A., on "Curiosities I have seen in and about Churches," 8 p.m.

Society of Arts.—Mr. J. Bridges Lee, M.A., on "Photography as Applied to Architectural Measurement and Surveying," 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Quarterly meeting of the members, 8 p.m.

THURSDAY, APRIL 17.

Society of Arts (Indian Section).—Mr. Sidney Preston, A.M.Inst.C.E., on "Recent Developments in Punjab Irrigation," 4.30 p.m.

Institution of Electrical Engineers (Dublin Section).—Mr. A. T. Kinsey on "Railway Blocks, Telegraphs and Accessories, recent practice," 8 p.m.

FRIDAY, APRIL 18.

Architectural Association Discussion Section.—Mr. A. Needham Wilson on "A Tour through the South of France," 7.30 p.m.

Royal Institution.—Right Hon. Sir John H. A. Macdonald on "The Autocar," 7 p.m.

Institution of Mechanical Engineers.—Mr. R. E. Atkinson on "The Standardisation of Pipe Flanges and Flange Fittings," 8 p.m.

Institution of Civil Engineers. (Students' Meeting).—Mr. H. C. M. Austen on "The Erewash Valley Widening and Toton Sidings," 8 p.m.

SATURDAY, APRIL 19.

Liverpool Architectural Society (Incorporated).—An Excursion to the new Gladstone Memorial Library at Hawarden. The Church and the Castle will be visited if time permit. Tea at the Glynn Arms Hotel at 5.30.

Edinburgh Architectural Association.—Visits: (1) To Traquair House; (2) The Tower of Innerleithen.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 3.—By NEWBON, EDWARDS, & SHEPHARD.

Kingsland.—Boleyn-rd., the Sutton Arms b.-h., &c., f.g.r. 33*l.*, reversion in 22½ yrs.	£1,340
Boleyn-rd., f.g.r.'s 15*l.* 10s., reversion in 55½ yrs.	520
180, 184, and 186, Boleyn-rd. (S.), f., y.r. 61*l.* 12s.	905
Boleyn-rd., the Woodman b.-h., f., y.r. 37*l.* 10s.	1,700
192, Boleyn-rd. (S.), f., y.r. 26*l.*	405
Stoke Newington.—St. Matthias-rd., f.g.r. 45*l.*, reversion in 29 yrs.	1,310
St. Matthias-rd., f.g.r. 31*l.* 10s., reversion in 28 yrs.	1,050
Highbury.—14, Bryantwood-rd., u.t. 97 yrs., g.r. 9*l.*, y.r. 42*l.*	£430
Barnsbury.—27, Huntingdon-st., u.t. 47 yrs., g.r. 7*l.*, y.r. 45*l.*	530

By ROGERS BROS.

Dulwich.—77 and 79, Melbourne-grove, u.t. 67½ yrs., g.r. 13*l.*, y.r. 58*l.*	620

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 11 6	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 9 6	,,	,, ,,
Facing Stocks	2 12 0	,,	,, ,,
Shippers	2 5 0	,,	,, ,,
Flettons	1 8 0	,,	at railway depôt.
Red Wire Cuts ..	1 12 0	,,	,, ,,
Best Fareham Red	3 12 0	,,	,, ,,
Best Red Pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 6 6	,,	,,
Do., Bullnose	4 10 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 5 6	,,	,, ,,
GLAZED BRICKS			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints.....	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints.....	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	9 0 0	,,	less than best.
Thames and Pit Sand	7	3	per yard, delivered.
Thames Ballast	6	0 ,,	,,
Best Portland Cement	32	0	per ton, delivered.
Best Ground Blue Lias Lime..	25	0 ,,	,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... 11s 0d. per yard, delivered.
Stourbridge Fire-clay in sacks, 26s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld. rly. depot
Bath ,, ...	1 7	,, ,,
Farleigh Down Bath ..	1 8	,, ,,
Beer in blocks	1 6	,, ,,
Grinshill ,, ...	1 10	,, ,,
Brown Portland in blocks	2 2	,, ,,
Darley Dale in blocks..	2 4	,, ,,
Red Corsehill ,,	2 5	,, ,,
Closeburn Red Freestone	2 3	,, ,,
Red Mansfield ,,	2 4	,, ,,
Hard York in blocks ..	2 10	,, ,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup)	2 8	per ft. super. at rly. depôt.
,, ,, 6 in. Rubbed Ditto..	3 0	,, ,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,, ,,
,, ,, 2 in. self-faced Ditto	0 9½	,, ,,
Hopton Wood (Hard Bed) in blocks	2	3 per ft. cube. deld. rly. depôt.
,, ,, ,, 6 in. sawn both sides landings	2	7 per ft. super. deld. rly. depôt.
,, ,, ,, 3 in. do.	1 2½	,, ,,

SLATES.

in.	in.	£ s. d.	
20 × 10 best blue Bangor..		12 0 0	per 1000 of 1200 at rly. dep.
,, best seconds	,,	11 10 0	,, ,,
16 × 8 best	,,	6 15 0	,, ,,
20 × 10 best blue Portmadoc ..		11 5 0	,, ,,
16 × 8 best blue Portmadoc		6 0 0	,, ,,
20 × 10 best Eureka unfading green....		12 2 6	,, ,,
16 × 8 ,,	,,	7 5 0	,, ,,
20 × 10 permanent green		10 5 0	,, ,,
16 × 8 ,,	,,	5 17 5	,, ,,

[See also p. 381.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Police and Fire Brigade Buildings	County Borough of Sunderland	100*l.*, 50*l.*, and 25*l.*	Aug 30

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Laundry, Pontnewynydd	Pontypool Steam Laundry Co.	D. J. Lougher, Architect, Bank Chambers, Pontypool	April 14
Two Shops, Kendal	.....	J. Bintley, Architect, 7, Lowther-street, Kendal	April 15
Additions to Offices, Dudwick, Ellon	.....	Wilsome & Duffus, Aberdeen	do.
Sewers, Bryn	Margam U.D.C.	J. Cox, Surveyor, Port Talbot	do.
Sewers, Witheridge	South Molton R.D.C.	W. S. Gardner, Surveyor, Chittlehampton	do.
Sewerage Works, Bury-road	Rochdale Corporation	S. S. Platt, Civil Engineer, Town Hall, Rochdale	do.
Cottage, Crumlin, Mon.	Great Western Railway Co.	G. K. Mills, Paddington Station, W.	do.
Road Materials	Knaresborough R.D.C.	J. Smith, 44, Station-parade, Harrogate	do.
Additions to Schools, Ditchling-road	Brighton School Board	T. Simpson & Son, Surveyors, 16, Ship-street, Brighton	do.
Alterations to Workhouse	Dromore West (Ireland) Guardians	H. Naughton, Board Room, Dromore West	do.
Sea Embankment Works	Tynemouth Corporation	J. F. Smillie, Borough Surveyor, North Shields	do.
Thirty-seven Cottages, Pontypridd	.....	T. R. Phillips, Architect, Old Bank Chambers, Pontypridd	April 16
Five Houses, Langdale-road, Barnsley	.....	R. & W. Dixon, Architects, 5, Eastgate, Barnsley	do.
Alterations to Stockwell Mount, Batley	.....	H. B. Buckley, Architect, 55, Commercial-street, Batley	do.
Additions to Hospital, Llanelly	.....	W. Griffiths, Architect, Falcon Bridge, Llanelly	do.
Alterations to Institute, Ipswich	.....	Eade & Johns, Architects, Cornhill Chambers, Ipswich	do.
Alterations to Church, Richmond-terr., Whitehaven	.....	J. S. Moffat, Architect, 53, Church-street, Whitehaven	do.
Business Premises, Brampton, Cumberland	.....	T. T. Scott, Architect, 43, Lowther-street, Carlisle	do.
Road Works, King's-road	.....	G. J. Wooldridge, Surveyor, Woking	do.
Sewerage Works	Woking U.D.C.	J. Turner, Surveyor, Saffron-lane, Glen Parva	do.
Sewerage Works, Lea Bridge-road	Blaby (Leics.) R.D.C.	W. Dawson, Civil Engineer, Town Hall, Leyton	do.
Bandstand	Leyton (Essex) U.D.C.	A. Fidler, Civil Engineer, Southend	do.
Footbridge, Hampton Mills	Southend Corporation	A. W. Bradley, Civil Engineer, Corporation Offices, Bury	do.
Additions to Netherfield Works, Windermere	Bury (Lancs.) Corporation	E. Walker, Architect, Windermere	do.
*Supply and Fixing of the Firemains Hydrants	Messrs. Somervell Brothers	F. J. Sturdy, 45, Finsbury-pavement, E.C.	do.
Hall, Drumcree, Portadown	West Ham Union	J. W. Walby, Architect, Portadown, Ireland	April 17
Two Cottages, Sutton Scotney, Hants	.....	W. & G. A. Bell, Architects, Andover	do.
Six Houses	.....	R. Holdsworth, Society's Offices, Silsden	do.
*Sewer Flushing Van	Silsden (Yorks) Co-op. Soc., Ltd.	W. H. Mansbridge, Surveyor, 40, High-street, Barnet	do.
*Road Making, Kerbing, Paving, &c.	South Minns R.D.C.	Council's Engineer, Town Hall, Hackney, N.E.	do.
*Building & Decorating Works, 180 & 182, Peckham Rye	Hackney Borough Council	Newman & Newman, 31, Tooley-street, S.E.	do.
*New Coastguard Buildings, near Falmouth	St. Olave's Union	Director of Works Dept., Admiralty, 21, Northumberland-avenue	April 18
Church and School, Stainton	Admiralty	J. W. Dickson, 2, Fairview, Dalton-in-Furness	do.
Roads, Cwmneol, Cwmaman	.....	Smith & Davies, Architects, Aberdare	do.
Road Works	Frinton-on-Sea U.D.C.	T. W. Golds, Surveyor, Thorpe-le-Soken, Essex	do.
Street Works, Brook-street	Hull Corporation	City Engineer, Town Hall, Hull	do.
Bridge Works, Hebers Ghyll	Ilkley U.D.C.	Surveyor, Council Offices, Ilkley	do.
Waterworks	Ardrossan (N.B.) Town Council	W. R. Copland, C.E., 146, West Regent-street, Glasgow	do.
Road Works, Bernard-road, &c.	Cromer U.D.C.	A. F. Scott, Surveyor, Church-street, Cromer	do.
Store Premises, Thornhill, Lees	Dewsbury Industrial Society, Ltd.	Holtom & Fox, Architects, Corporation-street, Dewsbury	do.
Car Shed, Holderness-road	Hull Corporation	A. E. White, Civil Engineer, Town Hall, Hull	do.
Church Restoration, Micklegate, York	.....	C. H. Fowler, Architect, Durham	April 19
Schools, Edgeworths Town, Ireland	Maidstone U.D.C.	T. F. MacNamara, Architect, 50, Dawson-street, Dublin	do.
Congregational Hall, Gateshead	Southborough (Kent) U.D.C.	A. L. Armour, 16, West-street, Gateshead	do.
Chapel, Runham, Great Yarmouth	Rev. W. Morgan	A. S. Hewitt, Architect, Regent-street, Great Yarmouth	do.
House, &c. Glenbucket	Mr. J. Alexander	Jenkins & Marr, C.Es., 16, Bridge-street, Aberdeen	do.
Road Materials	Haverfordwest Guardians	F. Bunting, Borough Surveyor, Fair Meadow, Maidstone	do.
Road Metal	Harrow-on-the-Hill U.D.C.	F. Hanmer, Council Office, Southborough	do.
Church, Landore, near Swansea	Wallasey U.D.C.	F. M. Bruce Vaughan, Architect, Cardiff	do.
House Dacre-terrace, Londonderry	Marple U.D.C.	J. M'Intyre, Architect, Letterkenny	do.
Additions to Workhouse	Ayr Harbour Trustees	D. E. Thomas, Architect, Victoria-place, Haverfordwest	do.
Street Works, Kenton-avenue	Lancaster Corporation	J. P. Bennetts, Engineer, Council Offices, Harrow	do.
Landing Stage Works, Seacombe	Basingstoke Town Council	Wood & Fowler, Engineers, 3, Cook-street, Liverpool	do.
Sewers, near Stockport	.....	H. Bancroft & Son, Civil Engineers, 88, Mosley-st., Manchester	do.
Quay Wall	.....	T. Meik & Sons, Engineers, 29, St. Andrew-square, Edinburgh	do.
Alterations to Farm Buildings, &c., Golgotha	.....	T. C. Hughes, Town Hall, Lancaster	do.
Well Sinking, Cliddesden	.....	G. Fitton, Town Hall, Basingstoke	April 21
Additions to Church, Kilkeel, Ireland	.....	W. P. Close, Architect, Belfast	do.
Eight Cottages, Gellyrheina, Wales	.....	The Manse, Chapel-lane, Carndiffaith, Mon.	do.
Additions to Inns, Lancaster	.....	J. Greene, Architect, Meeting House-lane, Lancaster	do.
Houses, Bective-road, Kirby Lonsdale	.....	J. F. Curwen, Architect, 26, Highgate, Kendal	do.
House, Wardhouse, N.B.	.....	J. Graigen, 193, Union-street, Aberdeen	do.
Alterations to Sewage Disposal Works	.....	F. H. Anson, Engineer, 14, Dean's Yard, S.W.	do.
Road Works, Oxford-road	.....	C. G. Mason, Civil Engineer, Tunsgate, Guildford	do.
Building Works, High-street	.....	Beaton & Co., Architects, 180, Hope-street, Glasgow	do.
Sewers, &c. (Contract 11)	Eastry R.D.C.	J. Diggle, Civil Engineer, Heywood, Lancs.	do.
Grit Setts	Guildford Town Council	A. T. Swain, Surveyor, Council Offices, Ince	do.
Houses, Dublin	Glasgow Corporation	Engineer, Amiens-street Terminus, Dublin	do.
Granite Road Metal	Chadderton (Lancs) U.D.C.	W. O. Times, Council Offices, Stevenage	do.
*Section and Road Name Plates, Islington Cemetery	Ince (Lancs) U.D.C.	Borough Engineer, Town Hall, Upper-street, N.	do.
*Boundary Walls, Shepherd's Bush	G. N. Railway Co. (Ireland)	J. H. Richardson, Architect, 87, Finsbury-pavement	do.
*Boundary Walls and Railing, Wormwood Scrubbs	Stevenage (Herts) U.D.C.	Giles, Gough, & Trollope, Architects, 28, Craven-street, Strand	do.
*Street Improvement Works	Islington Borough Council	Council's Surveyor, Bromley, Kent	April 22
*Supply of Road Materials	Hammersmith Guardians	do.	do.
*Making-up Roads, &c.	do.	Council's Engineer, 712, High-road, Tottenham	do.
*Wrought Iron Railings and Gates	Bromley U.D.C.	Borough Engineer, Town Hall, West Ham, E.	do.
*Steam Road Roller Shed and Offices	do.	do.	do.
Lodge, South Park	Tottenham U.D.C.	H. Shaw, Civil Engineer, Town Hall, Ilford	do.
Business Premises, Darwen-street, Blackburn	West Ham Council	Stones & Stones, Architects, 10, Richmond-terrace, Blackburn	do.
Sewerage Works	do.	T. J. Cooper, Council Offices, Biggleswade	do.
*Street Works	Ilford U.D.C.	Council's Engineer, Town Hall, Walthamstow	do.
*Extension Electric Tramcar Station and Depot	L. & Y. Bank, Limited	Council's Engineer, Wakefield-street, East Ham, E.	do.
*Main Sewerage Works	Biggleswade R.D.C.	Council's Offices, Kingsbury-road, N.W.	do.
*Supply of Timber	Walthamstow U.D.C.	Ordnance Survey Office, Southampton	April 24
Shed	East Ham U.D.C.	A. Price, Architect, Elworth	do.
Police Buildings, Uckfield	Kingsbury U.D.C.	F. J. Wood, Surveyor, County Hall, Lewes	April 25
*Erection of Police Buildings	Director-General, Ordnance Survey	County Surveyor, County Hall, Lewes	do.
*Sewerage Works	Congleton R.D.C.	J. C. Melliss, Engineer, 264, Gresham House, E.C.	April 28
Dock Extensions, Hull	East Sussex County Council	T. M. Newell, Engineer, Dock Office, Hull	April 30
Asphalting Works at Cemetery	East Sussex County Council	H. Horner, 9, Royal Parade, Harrogate	do.
*Shelter, Conveniences, &c., Island Gardens, Poplar	Sittingbourne U.D.C.	General Section, Archt's. Dept., County Hall, Spring Gardens	do.
*Making-up and Paving Waldemar-avenue	North Eastern Railway Co.	Borough Surveyor, Town Hall, Walham Green, S.W.	do.
*House for Private Patients	Harrogate Burial Board	G. T. Hine, Architect, 35, Parliament-street, S.W.	May 22
House, Rawcliffe, Yorks	London County Council	E. C. B. Tudor, Civil Engineer, Burlington Crescent, Ecole	No date
Additions to Schools	Fulham Borough Council	E. J. Harding, School Board Offices, Gateshead	do.
Excavation Works, Sedgwick, near Kendal	Dorset County Lunatic Asylum	A. Foulton, Sedgwick, near Kendal	do.
Road Works, Rainham, Kent	Mr. Cox	M. Harvey, Rainham	do.
Alterations to Schools, Buxton	Gateshead School Board	Garlick & Flint, Architects, Terrace-road, Buxton	do.
	Trustees		

[See also next page.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Chief Engineer and Surveyor	County Borough of Northampton.	600*l.* per annum	April 16
*Clerk of Works	Dover Union	30*s.* per week	do.
*Second Class Draughtsman	Metropolitan Asylums Board	125*l.*	April 21
*Clerk of Works	Lambeth Guardians	40*s.* 4*d.* per week	April 22

Those marked with an asterisk (*) are advertised in this Number. *Competition*, p. iv. *Contracts*, pp. iv. vi. viii. & x. *Public Appointments*, xviii. & xxii.

PRICES CURRENT (*Continued*).

TILES.

	s.	d.			
Best plain red roofing tiles	41	6	per 1,000, at rly. depôt.		
Hip and valley tiles	3	7	per doz.	,,	,,
Best Broseley tiles	48	6	per 1,000	,,	,,
Hip and valley tiles	4	0	per doz.	,,	,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	,,	,,
Do. ornamental Do.	60	0	,,	,,	,,
Hip tiles	4	0	per doz.	,,	,,
Valley tiles	3	9	,,	,,	,,
Best Red or Mottled Staffordshire Do. (Peakes)	50	0	per 1,000	,,	,,
Hip tiles	4	1	per doz.	,,	,,
Valley tiles	3	8	,,	,,	,,

WOOD.

BUILDING WOOD.—YELLOW.

	£	s.	d.	£	s.	d.
	At per standard.					
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14	10	0	16	0	0
Deals: best 3 by 9	13	10	0	15	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	10	10		11	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	,, ,, ,,		
2 in. by 4 in. and 2 in. by 6 in.	8	10	0	9	10	0
2 in. by 4½ in. and 2 in by 5 in.	8	0	0	9	0	0
Foreign Sawn Boards— 1 in. by 12 in. by 12 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: Best middling Dantzig or Memel (average specification)	At per load of 50 ft.					
Seconds	4	10	0	5	0	0
Small timber (8 in. to 10 in.)	4	5	0	4	10	0
Swedish balks	3	12	6	3	15	0
Pitch-pine timber (30 ft.)	3	13	0	3	0	0
	3	0	0	3	10	0
JOINERS' WOOD.	At per standard.					
White Sea: First yellow deals, 3 in. by 11 in.	22	0	0	23	0	0
3 in. by 9 in.	20	0	0	21	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	18	0	0
Second yellow deals, 3 in. by 11 in.	18	0	0	20	0	0
,, ,, 3 in. by 9 in.	16	10	0	18	10	0
Battens, 2½ in. and 3 in. by 7 in.	13	0	0	14	0	0
Third yellow deals, 3 in. by 11 in. and 9 in.	14	0	0	15	10	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	20	0	0	21	0	0
Do. 3 in. by 9 in.	17	0	0	18	0	0
Battens	13	0	0	14	0	0
Second yellow deals, 3 in. by 11 in.	15	0	0	16	10	0
Do. 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Third yellow deals, 3 in. by 11 in.	12	10	0	13	10	0
Do. 3 in. by 9 in.	12	0	0	13	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg:— First white deals, 3 in. by 11 in.	14	0	0	15	0	0
,, ,, ,, 3 in. by 9 in.	13	0	0	14	0	0
Battens	11	0	0	12	0	0
Second white deals 3 in. by 11 in.	13	0	0	14	0	0
,, ,, ,, 3 in. by 9 in.	12	0	0	13	0	0
,, ,, ,, battens	9	10	0	10	10	0
Pitch-pine: deals	16	0	0	18	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	32	0	0	33	10	0
Broads (12 in. and up)	2	0	0	more.		
Oddments	22	0	0	24	0	0
Seconds, regular sizes	24	10	0	26	10	0
Yellow Pine Oddments	20	0	0	22	0	0
Kauri Pine—Planks, per ft. cube	0	3	6	0	4	6
Danzig and Stettin Oak Logs—Large, per ft. cube	0	2	6	0	3	0
Small ,, ,,	0	2	3	0	2	6
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	7½	0	0	8
¾ in. do. do.	0	0	7	-	-	-
Dry Mahogany— Honduras, Tabasco, per ft. sup. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	16	0	0	20	0	0
American Whitewood Planks— Per ft. cube	0	3	0	0	3	6
Prepared Flooring—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	0	0	16	6
1 in. by 7 in. yellow, planed and matched	0	13	6	0	17	6
1¼ in. by 7 in. yellow, planed and matched	0	15	0	1	0	0
6 in. at 6d. per square less than 7 in.						
1 in. by 7 in. white, planed and shot	0	11	0	0	12	6

PRICES CURRENT (*Continued*).

WOOD.

Prepared Flooring.	Per Square. £	s.	d.	£	s.	d.
1 in. by 7 in. white, planed and matched	0	11	6	0	13	6
1¼ in. by 7 in. white, planed and matched	0	13	6	0	15	6
6 in. at 6d. per square less than 7 in.						

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	2	6	7	2	6
Compound Girders ,, ,,	7	17	6	8	17	6
Angles, Tees and Channels, ordinary sections	7	17	6	8	17	6
Flitch Plates	8	5	0	8	15	0
Cast Iron Columns and Stanchions, including ordinary patterns	7	0	0	8	0	0

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON—						
Common Bars	7	15	0	8	5	0
Staffordshire Crown Bars, good merchant quality	8	5	0	8	15	0
Staffordshire "Marked Bars"	10	10	0	-	-	-
Mild Steel Bars	9	0	0	9	10	0
Hoop Iron, basis price	9	5	0	9	10	0
,, ,, galvanised	16	0	0	-	-	-
(* And upwards, according to size and gauge.)						
Sheet Iron, Black.— Ordinary sizes to 20 g.	10	0	0	-	-	-
,, ,, to 24 g.	11	0	0	-	-	-
,, ,, to 26 g.	12	10	0	-	-	-
Sheet Iron, Galvanised, flat, ordinary quality.— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12	15	0	-	-	-
,, ,, 22 g. and 24 g.	13	5	0	-	-	-
,, ,, 26 g.	14	5	0	-	-	-
Sheet Iron, Galvanised, flat, best quality:— Ordinary sizes to 20 g.	16	0	0	-	-	-
,, ,, 22 g. and 24 g.	16	10	0	-	-	-
,, ,, 26 g.	18	0	0	-	-	-
Galvanised Corrugated Sheets.— Ordinary sizes, 6 ft. to 8 ft. 20 g.	12	15	0	-	-	-
,, ,, 22 g. and 24 g.	13	5	0	-	-	-
,, ,, 26 g.	14	5	0	-	-	-
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12	0	0	-	-	-
,, ,, 22 g. and 24 g.	13	0	0	-	-	-
,, ,, 26 g.	14	5	0	-	-	-
Cut nails, 3 in. to 6 in.	9	5	0	9	15	0
(Under 3 in. usual trade extras.)						

LEAD, &c.

	Per ton, in London £	s.	d.	£	s.	d.
LEAD—Sheet, English, 3 lbs. & up.	14	0	0	-	-	-
Pipe in coils	14	10	0	-	-	-
Soil Pipe	17	0	0	-	-	-
ZINC—Sheet— Vieille Montagne ton	24	10	0	-	-	-
Silesian	24	0	0	-	-	-
COPPER— Strong Sheet per lb.	0	1	0	-	-	-
Thin ,,	0	1	1½	-	-	-
Copper nails ,,	0	1	1½	-	-	-
BRASS— Strong Sheet ,,	0	0	11	-	-	-
Thin ,, ,,	0	1	1	-	-	-
TIN—English Ingots ,,	0	1	3	-	-	-
SOLDER—Plumbers' ,,	0	0	6½	-	-	-
Tinmen's ,,	0	0	8	-	-	-
Blowpipe ,,	0	0	9	-	-	-

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft. delivered.
,, fourths	2¾d.	,, ,,
21 oz. thirds	3¼d.	,, ,,
,, fourths	3d.	,, ,,
26 oz. thirds	4¼d.	,, ,,
,, fourths	4d.	,, ,,
32 oz. thirds	5¼d.	,, ,,
,, fourths	5d.	,, ,,
Fluted sheet, 15 oz.	3d.	,, ,,
,, 21 ,,	4d.	,, ,,
½ Hartley's Rolled Plate	2d.	,, ,,
⅝ ,, ,, ,,	2¾d.	,, ,,
¾ ,, ,, ,,	3½d.	,, ,,

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	2	9
,, ,, ,, in barrels	,,	0	2	10
,, ,, ,, in drums	,,	0	3	0
Boiled ,, ,, in pipes	,,	0	2	11
,, ,, ,, in barrels	,,	0	3	0
,, ,, ,, in drums	,,	0	3	2
Turpentine, in barrels	,,	0	2	6
,, in drums	,,	0	2	8
Genuine Ground English White Lead	per ton	21	0	0
Red Lead, Dry	,,	20	10	0
Best Linseed Oil Putty	per cwt.	0	8	6
Stockholm Tar	per barrel	1	12	0

PRICES CURRENT (*Continued*).

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Elastic Copal Varnish for outside work	0	16	6
Best Elastic Copal Varnish for outside work	1	0	0
Best Elastic Carriage Varnish for outside work	0	16	0
Best Hard Oak Varnish for inside work	0	10	6
Best Extra Hard Church Oak Varnish for inside work	0	10	6
Fine Hard Copal Varnish for inside work	0	16	0
Best Hard Copal Varnish for inside work	1	0	0
Best Hard Carriage Varnish for inside work	0	16	0
Extra Pale Paper Varnish	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
Best French and Brush Polish	0	10	0

TO CORRESPONDENTS.

A. D. G.—E. O. (Amounts should have been stated).

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* Denotes *accepted*. † Denotes *provisionally accepted*.

BROMLEY (Kent).—For proposed addition, Billiard-room, &c., to the Conservative Club. Messrs. B. Wadmore and W. R. Mallett, architects, London:—

	Buildings. £	s.	Fittings, &c. £	s.	Total. £	s.
W. C. Tapley	985	12	43	0	1,017	12
Fry & Willson	871	0	45	0	916	0
F. P. Duthoit	855	0	43	0	898	0
D. Payne	858	0	39	0	897	0
Crossley & Son	839	0	45	0	884	0
T. D. Graty	833	0	41	0	874	0

[All of Bromley.]

CARLISLE.—For the restoration of Kirklinton Church. Mr. J. H. Martindale, architect, Viaduct-chambers, Carlisle:—

Ceilings, Seats, &c.			
J. Phillips	£1,520	0	G. Black, Carlisle† £1,176 6
J. H. Reed	1,439	0	
Painters' Work.			
Taylor & Clifton	£412	0 6	D. Canning £60 0 0
W. M. Hill & Son	88	11 6	R. S. Kirk 49 17 6
R. M. Hill & Son	74	0 0	Penfold & Son, Brampton* 34 17 6
			R. Westray 34 0 0
Heating Apparatus.			
Langfield & Co.	£98	0 0	Dargue, Griffiths, & Co. £62 8 6
Grindrod & Co.	79	0 0	Corbett & Son 52 16 0
Greenwood & Co.	73	0 0	H. Skidmore 48 0 0
Dinning & Cooke	67	17 6	Seward & Co., Preston† 38 8 0
Werner, Pfleider, & Perkins	63	8 6	

CARLISLE.—For the erection of two bridges, Stapleton, for the Longtown Rural District Council. Mr. James Murray, surveyor, Kirklinton, Carlisle. Quantities by surveyor:—

Murray & Son, Stapleton, Brampton*	£379 13 1
Kayshouse Burn Bridge	£211 2 8
Bogburn Bridge	168 10 8
	£379 13 1

[Surveyor's estimate, £380.]

[*See also next page.*

EDMONTON.—For building married couples' quarters at the Workhouse, Silver-street, Edmonton, for the Guardians of the Strand Union. Mr. A. A. Kekwick, architect, 18, Outer Temple, Strand. Quantities supplied :—

Chessum & Sons	£4,872	Jarvis & Sons	£4,446
Willmott & Sons	4,770	Foster Bros.	4,387
Dearing & Son	4,659	T. G. Sharpington	4,349
Lawrence & Son	4,393	A. Monk, Lower Edmonton‡	4,330
J. Appleby	4,530	J. O. Richardson	4,058
R. E. Nightingale	4,512		
Shillitoe & Son	4,500		

‡ Recommended for acceptance.

EGHAM.—For new classrooms and alterations to the Station-road Schools, for the Egham School Board. Mr. James W. Oades, architect and surveyor, Egham, Surrey :—

Geo. Gray	£1,837	W. Beauchamp	£1,669
W. Searle	1,687	C. Buckeridge*	1,637

LLANEDY (Carmarthen). — For the erection of a school, Tycroes, for the School Board. Messrs. J. Davies & Son, architects, Cowell House, Llanelly :—

J. Vaughan	£2,010	Howell & Son, Ltd., Llanelly*	£1,593
J. Thomas	2,010		
Brown, Thomas, & John	1,519		

LLANELLY.—For enlarging and rebuilding Penbryn Chapel, Crosslands, Llanelly. Messrs. J. Davies & Son, architects, Llanelly :—

Lewis Davies	£1,135 0	Thomas & Sons	£933 13
J. & H. Vaughan	1,050 0	Brown, Thomas, & John, Llanelly*	930 0
Jones & Richards	996 0		

LLANELLY. — For house in Marble Hall-road, Llanelly, for Mr. W. Lewis, B.A. Messrs. J. Davies & Son, architects, Llanelly :—

Thomas & Sons	£683 8 6	Brown, Thomas, & John*	£554 0 0
Jones & Richards	631 0 0		
John Evans	565 0 0		

LLANGENNECH.—For erecting house and shop at Llangennech, for Mr. David Evans. Messrs. J. Davies & Son, architects, Llanelly :—

W. James	£229 7	J. Evans, Llanelly*	£193 0
W. Thomas	195 0		

LLANGENNECH.—For erecting house at Llangennech, for Mr. John Jones. Messrs. J. Davies & Son, architects, Llanelly :—

J. Evans, Llanelly* £190

LLANGENNECH. — For erecting two houses at Llangennech, for Messrs. David John Lewis & Abel Lewis. Messrs. J. Davies & Sons, architects, Llanelly :—

W. Thomas, Llangennech* £370

LONDON.—For the construction of new floors, &c., at Millwall, for the Electrical Power Storage Co., Ltd. Mr. Alfred Roberts, architect, Greenwich, S.E. :—

Yates & Co.	£2,193	H. Groves	£1,689
W. Mills	1,798	W. Martin*	1,687
T. D. Leng	1,737		

LONDON.—For alterations to Notting Dale Police Station. Mr. Dixon Butler, Architect :—

Willmott & Sons	£3,046	F. & H. F. Higgs	£2,694
T. Boyce	2,978	Lascelles & Co.	2,688
Higgs & Hill	2,884	J. Parker	2,670
Lathey Bros.	2,747	Grover & Sons	2,625
Holloway Bros.	2,740	C. Ansell	2,585

OSWESTRY.—For the construction of a swimming bath, the erection of a boiler house, chimney shaft, laundry, and other buildings at the Gymnasium, Victoria-street, for the Town Council. Mr. G. William Lacey, C.E., Borough Engineer and Surveyor :—

J. Higgins	£1,547 0 0	Jones & Evans, Oswestry*	£1,470 7 0
H. Price	1,520 0 0		
W. H. Thomas	1,487 11 3		

[Borough Engineer's estimate ..... £1,500.]

PEAR TREE GREEN (Hants).—For the erection of schools, High-street, for the St. Mary Extra (U.D.) School Board. Messrs. Mitchell, Son, & Gutteridge, architects, 9, Portland-street, Southampton :—

Hinton Bros.	£6,500	Jenkins & Sons, Ltd.	£5,985
Witt Bros.	6,475	Stevens & Co., Southampton*	5,860
H. Cawte	6,178		
Rashley & Son	6,083		

THORNHILL (Yorks).—For additions to cottage, Overthorpe-road, for the Urban District Council. Mr. S. W. Parker, Surveyor, Council Offices, Thornhill :—

Masonry.—Ellis P. Sheard, Thornhill	£104 10 0
Slating.—G. Hargreaves, Dewsbury	16 10 0
Joinery.—Wilson Bros., Dewsbury	39 0 0
Plastering.—A. Booth, Mirfield	10 15 6
Plumbing.—F. Mitchell, Savile Town	13 14 0
Painting.—B. Smith, Thornhill	2 5 0

UXBRIDGE.—For the erection of a pair of villas, Lawn-road. Mr. W. L. Eves, architect, 54, High-street, Uxbridge :—

H. C. Belch	£725 0	W. Fry	£570 0
Briant & Son	670 0	W. H. Randall, Uxbridge*	530 0
Ward & Sons	595 10		
J. James	590 0		

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